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ABSTRACT

The document is a collection of six papers on key problems in health manpower which were presented at a symposium during the 1974 spring meeting of the Institute of Medicine. A seventh paper provides a summary of the major themes at the conclusion of the program. All of the symposium papers deal with the principal manpower issues of supply, distribution of physicians by geography and specialty, and the role of non-physicians in the delivery of health care. Although the speakers differ on the relative importance of these problems and remedies for them, there is general agreement on certain basic propositions: (1) there is a maldistribution of physicians by geographic location and specialty; (2) there is a need for more physicians to enter the primary care specialites; (3) greater use of physician-extenders could improve physician productivity in the delivery of health care; (4) there is little real prospect for solving distribution problems through voluntary actions taken by physicians, medical schools, or teaching hospitals; (5) simply increasing the supply of physicians will not solve distribution problems. (Author/AJ)

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PAPERS OF THE
SPRING MEETING

Manpower for Health Care

May 8-9, 1974

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INSTITUTE OF MEDICINE

Manpower for Health Care

Papers of the
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National Academy of Sciences
Washington, D.C.

The Institute of Medicine was chartered in 1970 by the National Academy of Sciences to enlist distinguished members of medical and other professions for the examination of policy matters pertaining to the health of the public. In this, the Institute acts under both the Academy's 1863 Congressional charter responsibility to be an advisor to the Federal Government, and its own initiative in identifying issues of medical care, research, and education.

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INTRODUCTION AND SUMMARY

Health manpower considerations have become an increasingly important part of the program of the Institute of Medicine since its establishment in 1970. The Comprehensive Health Manpower Training Act of 1971 (P.L. 92-157) specifically authorized the secretary of Health, Education, and Welfare to request the National Academy of Sciences to conduct a study on the costs of education in the health professions, and a contract between HEW and the Institute of Medicine for that study was signed in the summer of 1972. Not long thereafter, other committees of the Institute were formed to examine the manpower aspects of primary health care, and to explore the roles that the Institute might play in contributing substantively to a growing national debate about more effective financing of health manpower training and services. Most recently, in April 1974, the Social Security Administration contracted with the Institute to plan a two-year study of three important problems in the health manpower area: 1) the basis on which Medicare and Medicaid should reimburse physicians and house staff in teaching hospitals, 2) the relationship between third party payments and the distribution of physicians by specialty and geographic location, and 3) the current and future role of foreign medical graduates in the U.S. health care system.

To further the Institute's activities in these areas, a symposium on health manpower issues was planned for the spring meeting of the membership, May 8-9, 1974. The symposium was designed both to inform the membership about current manpower policy issues and their relevance to Institute studies and to elicit from the members some thoughts on how these policy matters might be addressed in future Institute projects. Thus, the information flow was in two directions. Six papers on key problems in health manpower were presented to the members and other participants in plenary sessions. The members' views and opinions were then developed in a series of small group sessions. Finally, to bring together the issues raised both by the speakers and the small group sessions, John Iglehart, of *National Journal Reports*, provided a summary of the major themes at the conclusion of the second day's program.

All of the symposium papers dealt with the principal manpower issues of supply, distribution of physicians by geography and specialty, and the role of non-physicians in the delivery of health care. Although speakers differed on the relative importance of these problems and remedies for them, there was general agreement on certain basic propositions:

--there is a maldistribution of physicians by geographic location and specialty

--there is a need for more physicians to enter the primary care specialties

--greater use of physician-extenders could improve physician productivity in the delivery of health care

--there is little real prospect for solving distribution problems through voluntary actions taken by physicians, medical schools, or teaching hospitals

--simply increasing the supply of physicians will not solve distribution problems.

In his keynote address, Merlin K. DuVal identifies the major factors that affect the demand for health care and the supply of physicians available to provide that care. Dr. DuVal sees three categories of factors affecting the demand and, on the whole, increasing it. First are factors generated by consumers, reflecting their perceived need for care, the age distribution of the population, their income level, and their access to health care. The second class of demand factors is technologic; some high-technology developments in preventive medicine may decrease demand for health care but this saving likely would be more than offset by demand for care of lesser technologic development, such as organ transplants and renal dialysis. Finally, providers themselves generate demand for health care through excessive prescription of drugs, unnecessary surgery, and institutionalized practice that increases pressures for expensive inpatient care.

On the matter of supply, Dr. DuVal discusses the capability of medical schools to affect not only the absolute supply of physicians but also their specialty choice and eventual geographic location. He also notes that the adequacy of physician manpower can be increased by improvements in productivity through the use of physician-extenders, outreach activities, and new organizational structures for delivering health care.

In his conclusion, Dr. DuVal offers 10 policy recommendations to develop a system of incentives that might move the health enterprise toward a more rational distribution of health manpower and a containment of medical care costs.

Because so many legislative proposals concerning health manpower are based on one or another set of assumptions about the future supply and demand of physicians, an important objective of the symposium was to explain the limitations in our health manpower forecasting capability. U.E. Reinhardt undertook this in the second paper. Following through on some of the definitional and measurement problems raised by Dr. DuVal, Dr. Reinhardt points out that, in an ideal situation, policy-makers would have available to them detailed, reliable predictions of health manpower requirements under different organizational and manpower utilization models. With this kind of information, policy-makers could begin to make the kinds of trade-offs among health manpower policies that would lead to more or less efficient ways to achieve equilibrium between the supply of and demand for health manpower.

Dr. Reinhardt explains that most health manpower forecasting presently is based on simple physician/population ratios. But these forecasting models often choose the most favorable ratio in the nation, and ignore the potential benefits of using non-physician personnel in health care, with results that "virtually guarantee a continued escalation in estimated future manpower requirements," he says. And he warns that if we commit ourselves to produce more physicians to meet a predicted shortage in the future, we also commit ourselves to maintaining them in a secure economic position, a commitment that may not be consistent with the objective of keeping down health care costs.

Dr. Reinhardt is somewhat pessimistic about our developing the forecasting capability that he deems essential for making effective policy decisions. He sees planners continuing to play the numbers game, using simple projections of manpower needs, and little appreciating the flexibility that the health care system could have in employing different kinds of manpower. He finds, for example, that Federal policy towards the introduction of physician-extenders has been directed at developing the supply of them without serious thought about stimulating the demand for them. Dr. Reinhardt recommends that both policy-makers and researchers honestly assess their knowledge about health manpower forecasting and invest more time and effort into developing and using the kinds of detailed forecasts needed for effective long-range planning.

The factor of physician productivity, which Dr. Reinhardt regards as a major ingredient in health manpower forecasting, also enters into the considerations of the next two essayists, although the first is more directly concerned with the distribution of physicians geographically and by specialty. Kenneth M. Endicott says that the difficulty of measuring the extent of physician maldistribution has three main causes. First, the geographic and specialty distribution problems are intertwined; primary care physicians are more likely to locate in less desirable geographic areas than are subspecialists. Second, many specialists also provide a significant amount of primary care. Third, there is neither good empirical evidence nor professional consensus with which to assess the proper balance between primary care physicians (general practitioners, ob/gyn's, prediatricians, and internists) and other specialists. Dr. Endicott sees a clue, however, in the makeup of both HMOs and Canadian medical manpower. Primary care M.D.s as a proportion of total physicians are at least 20 percent higher in HMOs than in non-prepaid groups, and about 15 percent higher in Canada than in the U.S.

Dr. Endicott concludes that an increase in the supply of primary care physicians is the key to alleviating distribution problems, but that these problems are so great that they cannot be solved by policies that make only minor adjustments in the incentives affecting the health manpower training institutions and the incomes of practicing physicians. Dr. Endicott recommends that medical schools accept students who are more likely to enter primary care practice--e.g., women, rural students, and minority students--and that all students, including interns and residents, be given greater exposure to general medical practice, particularly in ambulatory care centers. As does Dr. DuVal, Dr. Endicott calls for financial incentives to steer medical graduates into shortage areas, and suggests that ties be established between rural physicians and medical centers to increase the outward flow of new ideas and to ameliorate the sense of academic remoteness experienced by many physicians in rural practice.

In his paper on the use of non-physicians in health care, Charles E. Lewis reviews the historical role of intermediate health professionals in the health care delivery system and warns that current conflicts over their roles could reduce their ability to improve the system.

Dr. Lewis divides the historical development of intermediate health practitioners into three phases. In the first phase, physicians simply trained their own employees--nurses, clerks, technicians, and others--to perform many of the physicians' tasks so that the overall job of providing patient care could be accomplished. The second phase occurred in the mid-1960s with the development of formal training programs and a subsequent accululation of evidence that their non-M.D. graduates were accepted by patients, delivered quality care, and increased the productivity of health units. According to Dr. Lewis, the third and current phase of the development of mid-level health practitioners is characterized by a "territorial power struggle" with respect to education, training, and deployment. Furthermore, to the extent that intermediate health practitioners are a part of the health care delivery system, they are perceived to be subject to the same pressures and incentives as physicians themselves. Dr. Lewis predicts that intermediate health practitioners will not locate in geographically underserved areas unless candidates are carefully pre-selected along the lines suggested by Dr. Endicott. If suitable controls are lacking, Dr. Lewis believes, there will be a tendency for non-M.D. practitioness to subspecialize, to demand reimbursement on a fee-for-service basis, and continue in the bias that limits the participation of women as practitioners, and pays them less than their male counterparts.

Touching on issues raised by all of the previous speakers, Henry Simmons outlines the Nixon Administration's position on federal policy for health manpower. Dr. Simmons reviews the objectives and accomplishments of the Health Professions Education Acts since their inception in 1963, and concludes that their goal of increasing the supply of health professionals is no longer appropriate. Using the kind of simple forecasting model Dr. Reinhardt discussed earlier, Dr. Simmons shows how the future supply of physicians will equal the demand even if medical school enrollments remain at their present level and the influx of foreign medical graduates slows down.

Dr. Simmons also contends that the distribution of physicians is not likely to be improved merely by continuing to increase their aggregate supply. He calls for a program that will maintain present medical school enrollments, increase the number of primary care physicians, and improve the productivity of all physicians through greater use of physician-extenders. The legislative program that can accomplish this, he says, includes a gradual phasing down of the capitation program for educational support and a loan and scholarship program that would help students pay a larger share of the costs of their medical education through higher tuitions. Scholarships would be available only to those students willing to serve in physician shortage areas after training. Money that would otherwise have gone into capitation would be used for special project grants to train primary care physicians, develop physician assistant and dental assistant programs, and maintain support to Area Health Education Programs.

As in the United States, health manpower problems in Canada stem not from an aggregate shortage of physicians and other personnel but from their uneven geographic distribution, John R, Evans says in his paper. He suggests that there even may be an oversupply of physicians in Ontario and British Columbia, and as Dr. Reinhardt, he warns of the economic costs associated with this situation. He points out that the aggregate cost of physicians' services in an area is directly related to the number of practicing physicians. Also, he says, if there are too many physicians, they may all work fewer hours, a situation that can lead to 1) a decline in physician productivity, 2) increased costs per unit of care as physicians adjust their fees upward, 3) decreased quality of services, and 4) a reduction in physician professional satisfaction. And a surplus of M.D.s may result in physicians using their "unoccupied" time to do work usually performed by professionals with less training.

Although Dr. Evans seems to suggest that one way to prevent a doctor surplus is to restrict the immigration of foreign medical graduates, he recognizes that this is politically difficult as long as there are shortages of health personnel in any areas of the country. Agreeing with previous speakers that a "super saturation-spillover approach" will not solve the geographic distribution problem, Dr. Evans calls for controls at the level of the utilization of physician services. He would establish upper limits on the number of M.D.s in each specialty permitted to practice in a region, by making physicians apply to a district health services council for practice privileges.

Dr. Evans finds little evidence in Canada of the specialty distribution problem raised by the earlier speakers as a key U.S. problem. Part of this may be due to the fact that medical schools have the responsibility for graduate medical training. This centralization more easily permits the establishment and implementation of guidelines for the size of different training programs. Also, to receive a Federal-provincial capital grant, a medical center must reserve at least 50 percent of its residencies for graduates entering primary care.

John Iglehart inserts in his summary of the proceedings a strong urging for academicians and administration personnel to develop a mutual understanding with key legislators on Capitol Hill. He called attention to the fact that several of the speakers warned of a possible oversupply of physicians but no one at the conference had posed an undersupply. This latter view is held by Congressman Paul Rogers, said Mr. Iglehart, and he is "the legislator who perhaps more than anyone else will influence the shape of the Comprehensive Health Manpower Act of 1974." Mr. Iglehart also emphasized that detailed assumptions and forecasts of health manpower supply and demand are less important than whether politicians believe them; the 50,000-physician shortage bandied about in 1971--real or not--was a key element in the enactment of first-dollar capitation support.

Maldistribution of physicians was a major problem on everyone's mind at the conference, Mr. Iglehart agrees, but he finds lacking any package of solutions that might be acceptable to both the Administration and Congress in the present season. The much increased use of physician-extenders, the redeployment of health personnel to underserved areas, and the imposition of controls on the numbers of specialists are measures that may well not be effectively employed, he believes, until the enactment of a national health insurance program.

Then, says Mr. Iglehart, instances of the people's lack of access to health care will create political pressures that no legislator will be able to ignore. He, as others, does not profess to know whether this will prove to be a good way to solve the problems.

HEALTH MANPOWER:

THE FACTORS AND ISSUES

Merlin K. DuVal, M.D.
Vice President for Health Sciences
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It has only been 15 years since Mr. Frank Bane, former executive director of the Council of State Governments, authored a report entitled "Physicians for a Growing America" in his capacity as chairman of the Surgeon General's Consultant Group on Medical Education. While a landmark publication in its own right, the report was, nonetheless, destined to be joined by the Bayne-Jones report, the Jones report, the report of the National Advisory Commission on Health Manpower, the Howard Report for the Association of American Medical Colleges, the position paper of the American Medical Association, the Carnegie Commission Report on Higher Education and the Nations Health, and, shortly, the Report of the Macy Commission on Physicians for the Future. That none of these reports, irrespective of how competently assembled, should have sufficed is testimony to the difficulties associated with accurately assessing the health manpower needs of these United States. Furthermore, that so many such efforts were undertaken at all is rather clear evidence that neither the medical profession nor the political leadership in the United States is entitled to any feeling of confidence that it knows what it is talking about in addressing this same problem today.

Why is this so? Our nation has continued to grow; there is an increasing disproportion in representation of both the younger and the older age groups within our population--both of which need more medical services than those in the interim years; there has been an increased individual use of medical services accompanying improvements in living standards; increased urbanization; more education; an increased use of health insurance; marked advances in medical knowledge; new Federal programs for rendering health services; an increase in the number of physicians required for specialized services such as research and teaching; new instruments for financing medical care, with others on the horizon; and most important of all, a growing consensus in the American public that reasonable access to competent health services is a proper claim of all citizens. Thus it is both significant and timely that the Institute of Medicine should have committed itself to address the problem of health manpower at this time.

My assignment in this exercise is to attempt to provide an overview of those facets of the problem that are most pertinent to your deliberations and to your intervention. Within this context I have chosen to focus on the medical manpower question first in terms of the factors that produce demand. I will then try to organize and categorize the specific factors that influence supply, whether they act on numbers, geographic or specialty distribution; and last, I will treat some policy issues that may have relatively immediate significance.

The first topic this program speaks to--and it is a logical first choice--is the question: "Is there a problem of physician supply at this time in the United States?" Personally, I find it difficult to approach the question of supply without first observing that supply is a function of expectations. To some of our population, expectations are an expression of need; to others, expectations are an expression of demand. This audience knows only too well that need and demand are not synonymous, and, further, that our capacity to plan is considerably weakened by our relative inability to measure either need or demand. I would submit, in fact, that one reason the problem of health manpower is becoming so acute right now is because in the absence of a capability for accurately assessing need we are instead becoming increasingly sensitive to stated demands. After all, demands are translated into solutions through the political process with greater effectiveness than are needs.

The customary yardstick for measuring the health of a nation's citizens is health indices. Unfortunately, such variables as the non-homogeneity of our population; the wide disparities in our geographic circumstances; sanitation, environment, economic circumstances, and culture; and the irregularities in our respective life styles--especially as regards our capacity for self-indulgence and self-abuse--ultimately make comparisons of health indices invidious and interpretations of their significance meaningless. Perhaps this explains why we have turned away from trying to estimate manpower needs from their use in favor of trying to adapt our supply of manpower to what is a *perceived* need instead. In this term of reference, this includes the demand for reasonable access to the health care system; convenience of entry; the growing knowledge of the American public that good health care is out there and that "if everyone else can have it, I want it too."

I would postpone then, for the moment, a further consideration of supply and examine, first the factors that bear on perceived need, or demand. The demand factors group themselves conveniently into three categories: those that are consumer-generated, those that are affected by technological advance, and those that are generated by the providing sector.

The demands that are consumer-generated derive first from the "business as usual" position, which says, in effect, that whatever constitutes the current level of care and one's access to it will be maintained. I can find no evidence to refute this position. On the contrary, experience shows that no matter what changes are undertaken in the health-care delivery system the demand does not diminish. A second element in consumer-generated demand goes substantially beyond this, however, in that it represents in almost all instances an amplification of demand that carries it beyond the business-as-usual level. For the most part, this amplification is traceable to such factors as the increasing shift to an older population, the overutilization that may accompany new financing plans, the increase in the level of consumer education that follows promotion about health services, the new purchasing power of an increasingly large segment of our population (and which is invariably accompanied by an increased request for health services that are delivered more conveniently and in higher "style"), and the increased utilization of services that derives from the arrival into the system--as a consequence of changing social mores--of those who were not previously included.

Demands may also be affected by technological advance. Sometimes, technological advance can have the affect of reducing demand and, in turn, costs. Preventive medicine, accident prevention, and immunization serve as such examples. Unfortunately, these higher technology advances are usually more than offset by middle and low technological advances that, once having been made, are vigorously promoted and deployed for common use. Organ transplantation, coronary intensive care and bypass surgery, and renal dialysis are such examples.

Demand for health services can also be increased by the providing sector. The increasing orientation toward practice in an institutional setting, the constantly escalating pressures on hospitals to achieve self-sufficiency, over-medication and unnecessary surgery, and defensive medicine against malpractice are just a few examples of how the provider elements may affect the demand for services--almost invariably increasing them.

It should be evident after this relatively cursory examination of some of the more important demand factors, even taking into account their offsets, that the aggregate demand for medical service is increasing. Thus it is that we are threatened with a heightened requirement on our health care system such that we are now challenged to respond. And this brings us back to the matter of supply and the factors that influence the supply of medical manpower.

For convenience, I would categorize supply factors as falling into two groupings. One is source-oriented and the other is policy-oriented. The first of the source-oriented factors is our medical schools. In 1960, we had 86 operating medical schools in the United States, from which the yield was approximately 7,000 graduates each year. In 1972, the number had grown to 112 schools from which approximately 10,400 students graduated each year. Today, there are approximately 16 more medical schools either on the drawing board or under development, and by 1976 we will be graduating approximately 13,000 new physicians each year. Parenthetically, this number will have outstripped the projected goal of the original Bayne Report by almost 20 percent.

The second source-oriented factor is the output from America's programs in graduate education. In 1962, there were 37,000 positions available for residency training in approved hospitals in the United States. Since the number of first-year positions within these approved programs was considerably greater than the number of graduates of American medical schools, foreign medical graduates filled the balance of the positions, thereby adding to our manpower supply beyond the capacity of our medical schools. In 1972, there were 51,000 residency training positions available and, although the number of graduates from our medical schools had increased disproportionately with the result that foreign medical graduates, in increasing numbers, filled the positions. As a consequence of this disproportion, we now have a situation such that the number of new licenses granted in the United States each year is almost evenly divided between graduates of foreign medical schools and U.S. medical schools.

The third source-oriented supply factor is the choice that each graduating physician makes with respect to his field of specialty interest. Whether this choice derives from the personality and the background of the student, the influence of the medical faculty, or the availability of residency positions is unknown. What is important is that there has been a progressive swing toward the choice of narrow specialty practices, a vigorous growth in the selection of surgery and its sub-specialties, and a diminishing interest in first-contact medicine.

The fourth source-oriented factor influencing supply is the personal choice of each physician with respect to geographic location. Here again, the relative influence of urban as opposed to rural settings, cultural opportunities, school systems, preference of the spouse, choice of professional associates, personal safety, or the physician's place of birth or education is not clear. What is clear is that physicians have chosen the Middle Atlantic states to the extent that there are now 195 physicians for every 100,000 population in that area; 142 physicians have selected the Mountain States for every 100,000 of its residents, and only 102 physicians have selected the East-South Central States for every 100,000 persons living in that area. Note that this variation is close to 100 percent. The disparities are even more striking within the center of some of our largest urban/metropolitan communities.

The fifth source-oriented factor that affects the supply of medical manpower is best described by the term "change in productivity units." On the one hand, individual productivity may taper under some of our existing financial arrangements and regressive income tax structures because incentive tends to fall as earnings increase. However, this appears to be more than offset by the increase in individual productivity that is the result of increased acceptance of, and reliance upon, physician extenders and outreach programs, and the greater use of sophisticated instrumentation.

Supply is also being markedly affected through the adoption of new organizational arrangements among health care providers. Group practices, prepaid health care plans, closed panels, health maintenance organizations, and ever-expanding Federal programs for specifically designated beneficiaries are having their impact on supply factors because they change the mode of entry into the health care system. Entry into the system is every bit as dependent on the manner in which the health care system is organized as it is on the skills or the expertise that is available at the first point of contact. This principle has now been well established by the experience of the United Kingdom under the British National Health Service.

Last, there are certain quality factors that are source-oriented and also affect the supply of medical manpower. The relatively rigid educational process that derived from the Flexner Report sixty years ago, and that makes the expansion and replication of American medical schools exceptionally expensive and difficult, is one of these. The process for selecting medical students for entrance into medical school, differential state licensures, the National Board of Medical Examiner's examinations, and the examination of the Educational Council for Foreign Medical Graduates are other quality-related factors that may affect the supply side of the equation.

The second group of supply factors is policy-oriented. I am inclined to list them separately, even while acknowledging that they ultimately operate through the source-oriented factors, for the appealing reason that they are susceptible to separate treatment. I suspect, indeed, that these factors can reasonably be expected to attract a great deal of your own attention at this meeting.

The policy-oriented factors can be conveniently divided into two subgroupings. The first of these is the role of reimbursement or payment for services that have been rendered. Let me provide some examples. Clearly, differential fee schedules may have a considerable effect on what a physician does--both in terms of his original career choice and what he does within his chosen specialty. Similarly, ranges in the usual and customary fees by geographic location may affect the geographic distribution of physicians. The negative incentive relative to reimbursement that may be associated with an office location in an area characterized by great poverty may drive the physician to wealthier suburbs. The opportunities that institutional practice may afford, particularly for those who practice certain medical specialties, obviously helps shape the distributional profile of physicians. The extent to which the additional cost of using physician extenders can be covered through reimbursement schemes, or whether such persons are separately reimbursed, are issues that are necessarily going to affect the physician's choice of location and the mode of his practice, as well as his productivity units.

The second subgrouping of policy-oriented factors that bear on supply is the role that payment or reimbursement plays in the educational process. Medical schools have already demonstrated a capacity to respond to the pressures for increased enrollments and shortened curricula after capitation formulas were pegged to such objectives. The availability of special project grants and, until recently, the availability of matching funds to meet the cost of new construction for academic buildings have also had an important effect. The manner in which graduate medical education is currently financed, and the alternatives that are only now beginning to take shape, can reasonably be expected to have a further effect upon the supply of health manpower.

At this juncture, my instinct is to apologize for having subjected you to a recitation bordering on a litany since each of you already has a considerable grasp of the factors I have been discussing. Instead of apologizing, however, I will simply try to justify my having chosen this approach by saying that, in anticipation of your small group discussions, my sense of tidiness compelled me to review as many of the major factors that bear on the question as I could so that your discussions will be focused and more fruitful.

But I had a second objective. Having been invited to include in my comments a free-ranging consideration of some of the policy issues that might be worthy of your attention, I needed a matrix that would give additional relevance, if not credence, to the particular policy issues I have chosen to single out.

Any consideration of the imbalance that is perceived to exist between the demand for health services and the supply of physicians must start with the question of whether or not an increase in the production of physicians will contribute to a solution to the problem. In 1959, the year in which the Bane Report was published, there were approximately 250,000 physicians in the United States. This provided a ratio of approximately 149 physicians for each 100,000 of our citizens. Last year, there were over 360,000 physicians in the United States, thus providing a ratio of 173 for each 100,000 of our citizens. This very remarkable gain in physician manpower has obviously occurred at a rate that is faster than the rate at which our population has increased.

The gain has been made on two fronts. First, there has been a marked increase in the number of students studying medicine. This has been achieved through increased enrollments in existing medical schools and through the development of new medical schools. Second, there has been a striking increase in the rate of immigration of graduates of foreign medical schools. These increases have already brought us to a position such that we now compare favorably with the other industrialized nations of the world in terms of physician-population ratio. Further, the Health Resources Administration of the Department of Health, Education, and Welfare currently estimates that by 1990 we will have over 400,000 physicians in the United States, for a ratio of 237 physicians to every 100,000 persons. This would put the United States among the top three, if not first, among all nations with regard to this statistic.

When one attempts to find a relationship between the physician-population ratio and any of several health indices among the nations of the world, one soon finds that, beyond a point that remains ill defined, the health of the people is apparently not measurably improved by a further increase in physicians. Since the United States is rapidly approaching the highest physician/population ratio of all nations (including those with national health systems and systems of conscription), and since nations with higher physician/population ratios than that in the United States have the same problems relative to distribution that we have, and since medicine operates as a closed system in which an increase in the number of physicians may result in an increase in demand for health services at an increased unit cost, and since the productivity of physicians can reasonably be expected to increase substantially through enhanced technology, new organizational arrangements and the use of physician extenders, it is hard to avoid the conclusion that, in terms of supply, the United States is well on the way toward closing such gaps in numbers as have ever been projected. Unless American medicine were suddenly to express an interest in abandoning its traditional mode of operation and its professional ethics and enter the free marketplace so that the distribution of its services became competitive and otherwise operated under traditional economic principles, restraint would appear to be in order as regards the development of policies that would move us toward any further, substantial increase in physician output.

Let me draw on an additional line of reasoning to try to make this point. I am not among those who seem to apologize for our current educational process in medicine. Indeed, the contemporary academic health center is just possibly one of the most effective instruments for achieving certain objectives that society has ever developed. But this observation hides a paradox. The enormity of the resources within our jurisdiction and the complexity of our internal arrangements are such as to preclude, in my judgment, the possibility that these same institutions could, or for that matter should, accept more than a modest portion of the prescription that our contemporary society is now writing. Consider, for example, that external support--particularly that which is Federal in origin--is now being spread across these institutions in such a manner as to help all schools in pretty much the same way. This arrangement tends to reinforce and lock in our current arrangements, maybe even to guarantee their perpetuation in much the same way that Medicare, in 1965, tended to lock in place the current system for distributing medical care on a fee-for-service basis.

Under these circumstances, the current structure of medical schools--with multiple specialty departments represented in the undergraduate curriculum, with faculties of similar orientation picking similar types of students, and with an essentially traditional curriculum in all institutions--make it a virtual certainty that the arrival of our future graduates into the practice sector will tend to exaggerate rather than mitigate the observed trends toward increased specialization and geographic maldistribution. If this projection is accurate, the adoption of any policy that fosters a further substantial increase in the output of physicians will, in my judgment, only tend to make that situation worse rather than better. I would again submit, therefore, that the solution to the problem we are addressing does not lie in a further increase in the rate at which we are currently producing physicians.

To have reached this conclusion does not mean that the answer we are seeking lies elsewhere than with the supply side of the supply/demand equation. There are several factors affecting supply that are capable of being modified in such a way as to offer a high degree of relief for the current situation, as I see it. Consequently, I would like to offer for your consideration a ten-point package that is designed to treat those supply factors as policy issues. Three of them are aimed at our medical schools, five are directed at the Federal government, and two at practicing physicians.

Let me start with the medical schools. If there is a predominant characteristic of contemporary medical education it is the progressive amplification and application of science to the diagnosis and treatment of disease. It is difficult for me to believe that anyone could seriously quarrel with the benefits that have derived from the application of higher science to disease. And yet our medical schools are among the targets for criticism, especially respecting their seeming lack of responsiveness to producing the type of physician America appears to be looking for. This is ironical, because our medical schools have not been insensitive to this criticism; on the contrary, they have made a considerable effort to respond. We have shortened our undergraduate curriculum, diminished our emphasis on the basic sciences as bodies of knowledge independent of clinical relevance, introduced the students to clinical medicine early, offered opportunities for elective study, and introduced selective educational tracks leading to intensive study that is more consistent with ultimate career choices.

And yet, this response does not seem to have done very much to quiet criticism. Under the circumstances, I would suggest that perhaps the response has taken the wrong form. The explosive growth of scientific knowledge and its application to clinical medicine was expressed through an increased emphasis on clinical subspecialization in the undergraduate years. Inasmuch as this change had to take place within a relatively rigid academic framework, it necessarily required both fractionation and displacement of other appropriate curriculum entries. The penalty was two-fold. First, it eroded the essential scientific underpinning that had characterized the very advances of which we are most proud, and second, it tended to displace general medicine as a proper starting point for all students earning their M.D. degrees.

Therefore, my first recommendation is that our medical schools should reaffirm their belief in the necessity of a strong basic science experience as underpinning for the study of clinical medicine. And my second recommendation is that medical schools should take such steps as are necessary to de-emphasize specialty and sub-specialty medicine in the undergraduate curriculum and focus, instead, on general medicine. Specialists should be used as consultants to the student in exactly the same way that medicine is applied to the individual patient in the practice setting.

There has been a considerable recent resurgence in the thesis that the education of a physician should be regarded as a continuous process. The Millis Commission Report, particularly, was vigorous in its pursuit and analysis of the idea that graduate education was a proper domain of universities. Thus, although a substantial majority of all graduate educational opportunities do come within university jurisdiction today, the important point is that there are many that, as yet, do not. Currently, there are twice as many first year positions available in graduate training programs as there are graduates of American medical schools, and the quality control over the residencies that are not university-affiliated leaves much to be desired in some instances. Since the university-affiliated graduate programs are considerably more likely to be specialty oriented rather than family practice oriented, and since the numbers are determined by program directors acting independently of institutional concerns or external needs, and since the Immigration Service of the Department of Labor has no choice but to permit the immigration of foreign medical graduates into the United States in view of the unfilled positions that are available, and since the availability of these positions is known to all disappointed applicants to American medical schools (thereby serving as an attraction to them to get their medical education in a foreign medical school), it follows that many of the problems that relate to specialty imbalance and to the massive immigration of foreign medical graduates are treatable at the existing interface between undergraduate and graduate medical education.

My third recommendation, therefore, is that universities assume the responsibility for medical education as a continuum from entrance into medical school through the completion of graduate training. Adoption of this principle will require that universities begin to tailor the number of first year positions in graduate training more nearly to the size of our graduating classes.

As a counterpoint to these suggestions, there are five steps that should be taken by the Federal government. First, if the government is indeed prepared to implement a public policy which says that access to health services should be among the rights of our citizens, independent of their economic or geographic circumstance, then it also must accept the responsibility for underwriting a portion of the costs of medical education directly and, further, undertake programs appropriate to the needs of our underserved areas.

I would recommend, therefore, that the government make available first-dollar funding to America's medical schools as an entitlement, without conditions, by a capitation formula pegged to the number of students being released from the schools' graduate training programs each year.

I would recommend further that the government purchase, from among the students already admitted to medical school, commitments by that number of students that over a two year period of service will meet the needs of underserved areas--paying each student directly, throughout his training period, using the ASTP and V-12 programs of the early 1940's as models. I might add, parenthetically, that I still cling to the belief that this would have been a better solution for the problem of finding appropriate numbers of physicians to serve in the Armed Services than was creating the Armed Forces University for the Health Professions.

Subsequent to the adoption of the Kerr-Mills Bill, and certainly in response to the arrival of Medicare in 1965, we have seen a reinforcement of what some would describe as an inequitable system of reimbursement for physicians' services. This conclusion derives from several decades of experience in the field in which the value of certain services were thought to have become disproportionate to the value of others. The adoption of the California Relative Values Scale, and the incorporation of usual and customary fee schedules into Medicare regulations, had the effect of postponing a further consideration of these discrepancies.

Surely, machinery that is professionally oriented can, over time, come to grips with this problem. In the meantime, however, there is no valid reason for postponing a consideration of the effect that reimbursement levels may have on both the geographic and specialty maldistribution of physicians. My third recommendation to the Federal government, therefore, is that all existing federal financing programs, and all that are contemplated, should incorporate reimbursement rates and fee schedules that favor physicians who elect to engage either in first contact medicine or who are willing to serve in areas of the nation declared to be underserved. I would further recommend that, as an incentive to physicians to increase their personal productivity, all existing federal financing programs, and all that are contemplated, should provide incentive reimbursements to physicians who are willing and able to use physician extenders.

It is difficult not to be impressed with the growing experience of closed panels, pre-paid practice plans, and national systems such as the British National Health Service. Within such arrangements the superspecialist does not serve as a contact-point for the patient who seeks entry into the system but, rather, as a natural extension of the competence and need of the physician first contacted. Whether or not a furtherance of such arrangements is in the best interest of the United States at this time cannot be said. But I am one who is persuaded that there are merits to such arrangement, not the least of which being that competition between consultants--to serve as referral points for first-contact physicians--might develop, within the existing fee for service tradition, to the benefit of all.

My last recommendation to the government, therefore, is that it should undertake to encourage and support pilot projects that have as their objective the creation of practice arrangements in which consultants are paid for their services by such first-contact physicians as family practitioners, internists, pediatricians, and obstetricians rather than by insurance carriers or by the patients themselves.

The last two recommendations I would make are directed at practicing physicians although, in both instances, a direct assist would be in order from our medical schools. First, it is impossible not to be favorably impressed with the manner in which the productivity of each physician can be enhanced, often very substantially, through the use of physician expanders. The Medex experiment, the pediatric nurse associate, the Community Health Medic of the Indian Health Service, the newly expanded role of the nurse, and the several categories of physician assistant, have proved beyond question that a physician who has learned to incorporate, into his own practice setting, the services of persons less thoroughly trained than himself greatly expands his personal, professional capacity. It is as if he replicates himself without the time delay, expense, and other investments necessary to educate another physician.

I strongly recommend, therefore, that all practicing physicians be openly encouraged to increase their personal productivity by diverting themselves of those skills and tasks that can be done by others. And, as a corollary, that our medical schools help in furthering this objective by encouraging the development of programs that interdigitate the educational experiences and opportunities that take place in the clinical setting for all appropriate health professionals.

Last, it is probably important to observe that medicine is practiced in a passive-receptive mode--that is, a physician responds to the problem that is brought to his attention. He does not actively market his service. In a day and age when society is pleading for us to close the gap that exists between our capacity for rendering service and the needs of our citizens who are thought not to have access to those services, there is no way that a passive-receptive mode can be adapted to provide a solution. Such a circumstance invites externally applied solutions.

Personally, I am convinced that a solution is possible within the profession itself. The solution is based on two premises. The first is that physicians can, in fact, effectively market their services in such a way as to close the gap in the distribution of their services; the second is that physicians who work within a given specialty know best how to meet the needs of their community of potential patients.

My last recommendation, then, is that all medical specialists, and particularly subspecialists, be encouraged to organize regionally for the purpose of identifying the needs of their own regional community for the services they render and then, by rationalizing the physical and human resources that are necessary to meet those needs, establish the interprofessional relationships and arrangements that may be necessary to achieve that objective.

I regret very much that the constraints in time that are imposed on us in this gathering are such as to preclude an amplification and more thorough exposition of these recommendations, but I have confidence that your considerable sophistication as regards these matters will permit you to fill in the gaps in my presentation. It has been said that the hallmark of the mature mind is a capacity for making responsible judgments based on information that is less than adequate. The mature minds are in this audience; my contribution is limited to having provided you with inadequate information.

As you now begin your deliberations, I do offer one last petition. Ultimately, public policy is the expression of special interests that are not always synonymous. Unlike most other subjects, however, there are ultimately only two parties at interest as regards health: the health professional and the people he serves. In our unique position, society has granted us extraordinary privileges. It would be easy to abuse that grant. As members of the Institute of Medicine I would submit that it is incumbent on us not to let our self-interest displace the concern of the people we serve as we hammer out our recommendations.

HEALTH MANPOWER FORECASTING:

CURRENT METHODOLOGY AND ITS IMPACT ON HEALTH MANPOWER POLICY

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I. Introduction

For students of the health-care sector and for the formulators of the nation's health policies, the next year or so promises to hold some of the more exciting moments in decades. It appears that Congress is finally moving toward a consensus on national health insurance and that major legislation in that area can be expected soon. At the same time, legislative authority for the decade-old Health Professions Educational Assistance (HPEA) program expires this year and must either be extended--as is or in modified form--or perhaps even left to wither. For those whose task it is to frame the nation's health policy, the coming year will clearly be a busy one. The more detached students of this policy, on the other hand, may either jump into the breach and actively participate in the policy-makers' task or, should they be too timid or their learned counsel be rejected, watch the process from the bleachers and comment cirtically on what they see. In either case, a contribution can be made by everyone.

This essay may be taken either as a tendering of counsel or, should it be rudely (and clearly unjustly) rejected, as a downpayment on criticism yet to come. The focus of the discussion is solely on health manpower policy at the Federal level and, in particular, on the role of health manpower forecasting in the formulation of that policy. Some methodological problems of health manpower forecasting are examined in section II following. Section III contains one economist's thoughts on current issues in the area of health manpower legislation.

In view of the heterogeneity of this audience, an attempt has been made to develop the discussion without undue resort to economic jargon. A few equations, it is true, are used here and there, but always to clarify the verbal exposition and not, as sometimes happens, to add mere scholarly decor to an otherwise straightforward presentation.

II. A Basic Analytic Framework for Health Manpower Forecasting

There are basically two extreme postures one could adopt in the formulation of Federal health manpower policy. First, one could develop that policy as essentially a reaction to what is viewed as exogenously determined shortages (or surpluses) of particular types of health manpower. On this approach, one could respond to a predicted shortage by subsidizing the construction of additional training facilities and/or by rendering financial aid to the entrants into health manpower training programs. On the other hand, the policy response to a predicted surplus

TABLE 1

ALTERNATIVE PROJECTIONS OF PHYSICIAN REQUIREMENTS UNITED STATES, 1975.

Projection study	Requirements (I)	Supplies (II)	(−) Deficit** (+) Surplus) (III)
1 Bane Committee Report	330,000 (minimum)	(a) 312,800 (b) 318,400	−17,200 −11,600
2 Bureau of Labor Statistics (1966)	305,000	—	—
3 Fein	(a) 340,000 to 350,000 (b) 372,000 to 385,000	361,700	+21,700 to +11,700 −10,300 to −23,300
4 National Advisory Commission on Health Manpower	346,000 (minimum)	360,000	+14,000
5 Bureau of Labor Statistics (1967)	390,000	360,000	−30,000
6 Public Health Service	(a) 400,000 (b) 425,000	360,000	−40,000 −65,000

Note: *Physicians include both M.D.'s and D.O.'s, except for Line 2 which excludes D.O.'s.
**Column (II) minus Column (I). A (−) indicates a deficit; (+) indicates a surplus.

Sources:

Line (1) Surgeon General's Consultant Group on Medical Education. Frank Bane, Chairman. *Physicians for a Growing America.* (Washington: GPO, 1959)
Column (I) Table 2, p. 3.
Column (II) (a) and (b) Table 2, p. 3.
Column (III) Calculated.

Line (2) U. S. Bureau of Labor Statistics. "America's Industrial and Occupational Manpower Requirements, 1964-1975." In: *The Outlook for Technological Change and Employment.* Appendix Volume 1 to *Technology and the American Economy*, Report of the National Commission on Technology, Automation, and Economic Progress. (February 1966)
Column (I) Page I-141; obtained by multiplying the number of employed physicians in 1964 (265,000) by the "nearly 15 percent" projected rise in "employment" from 1964 to 1975. A study of this report indicates that the word "employment" is used as a synonym for "requirements."
Column (II) No figure is available.
Column (III) Not calculated.

Line (3) Fein, Rashi. *The Doctor Shortage: An Economic Analysis.* (Washington: The Brookings Institution, 1967)
Column (I) (a) Based on 12-15 percent increase due to population growth above. (b) Based on 22-26 percent increase due to all factors. See pp. 134-135.
Column (II) Table III-9, p. 87.
Column (III) Calculated.

Line (4) National Advisory Commission on Health Manpower. *Report, Vol. II.* (Washington: GPO, 1967)
Column (I) Based on 13.5 percent increase in total visits by 1975. See p. 243.
Column (II) Table 4, p. 235.
Column (III) Calculated.

Line (5) U. S. Bureau of Labor Statistics. *Health Manpower 1966-1975, A Study of Requirements and Supply.* (Washington: GPO, 1967)
Column (I) Page 18.
Column (II) No figure is given. I assume NACHM supply figure of 360,000 is appropriate to use.
Column (III) Calculated.

Line (6) U. S. Public Health Service, *Health Manpower, Perspectives 1967.* (Washington: GPO, 1967)
Column (I) (a) and (b), Table 8, p. 15, and accompanying text.
Column (II) Same as Column II, line 5.
Column (III) Calculated.

SOURCE: Hansen (1970), p. 107

might be to do nothing, or at most to eliminate whatever subsidies to health manpower training have been and are being granted. Errors in the pursuit of this policy are unlikely to be viewed symmetrically. The overriding goal inevitably will be not to err on the downward side--for example, not to permit reductions in the physician/population ratio--even if this means occasional errors on the upward side. The approach tacitly ratifies whatever particular use the health-care sector chooses to make of the available health manpower.

At the other extreme, health policy-makers might develop their policies against the standard of some preconceived "ideal" health delivery system (read: health manpower configuration) and consciously seek to drive the health-care sector toward this ideal if that sector cannot be expected to do so on its own volition. This might be attempted either through outright and pervasive direct regulation of individual components of the health care sector--for example, the mandating of regional networks of health-care facilities or the prescription of optimal staffing patterns for hospitals, nursing homes and medical practices--or more indirectly through the design of a set of financial incentives likely to elicit desired modes of conduct from the providers of health services (and, of course, from their patients as well). On this approach, it might be possible to insist on efficiency in the use of whatever health manpower is available to the health-care sector.

Although Federal health manpower policy in this country does not fit either of these models perfectly, it seems traditionally to have tended more toward the first, at least until very recently. Without, for the moment, commenting on the merits of that approach, it can be observed that its success depends crucially on the availability of reliable health manpower forecasts. Since the gestation period in developing additional training facilities can easily extend over a decade and since the effect of such additions on the supply of manpower is played out fully only after three to four decades, it is clear that the forecasts underlying this approach to health manpower policy must have validity for several decades in the future as well. Unfortunately, the state of the art in this area does not yet seem up to that task, nor is it likely to ever be. Table 1 serves to illustrate this assertion.

Table 1, lifted directly from Lee Hansen's "An Appraisal of Physician Manpower Projections" (1970), presents demand and supply projections for medical manpower made at various times in the past for the target year 1975. It will be noted that these projections range from a surplus of 21,700 physicians to a deficit of 65,000. To some extent this range reflects the fact that the underlying forecasts were made at different times and that both projected requirements and projected supplies have tended to increase over time. There is, however, considerable variation even among forecasts made at roughly the same time (see, for example, the requirements estimates under lines 2 to 6, all made during the period 1966-67). Quite obviously, so rich a menu of health manpower projections is not particularly helpful in developing the type of health manpower policy under discussion here. It is apt to give indigestion to those in charge of that policy.

It may be suggested that lack of success in the area of health manpower forecasting betrays a lack of serious effort on the part of the forecasters. While there is much shoddy work in any area of science, in this instance the allegation would be unfair. The difficulty lies in the very nature of the task itself, a task best described as "Mission Impossible." In elaborating upon this proposition, it may be well to review briefly the various analytic building blocks of which a health manpower forecast is composed.

Figure 1 is a graphical description of a very rudimentary model of health manpower forecasting. The forecast illustrated by the diagram is thought to be for physicians rendering patient care (hereafter referred to as "patient-care physicians"). Figure 3, further on, illustrates the complexity of health manpower forecasting when more than one type of health manpower are included in the forecast.

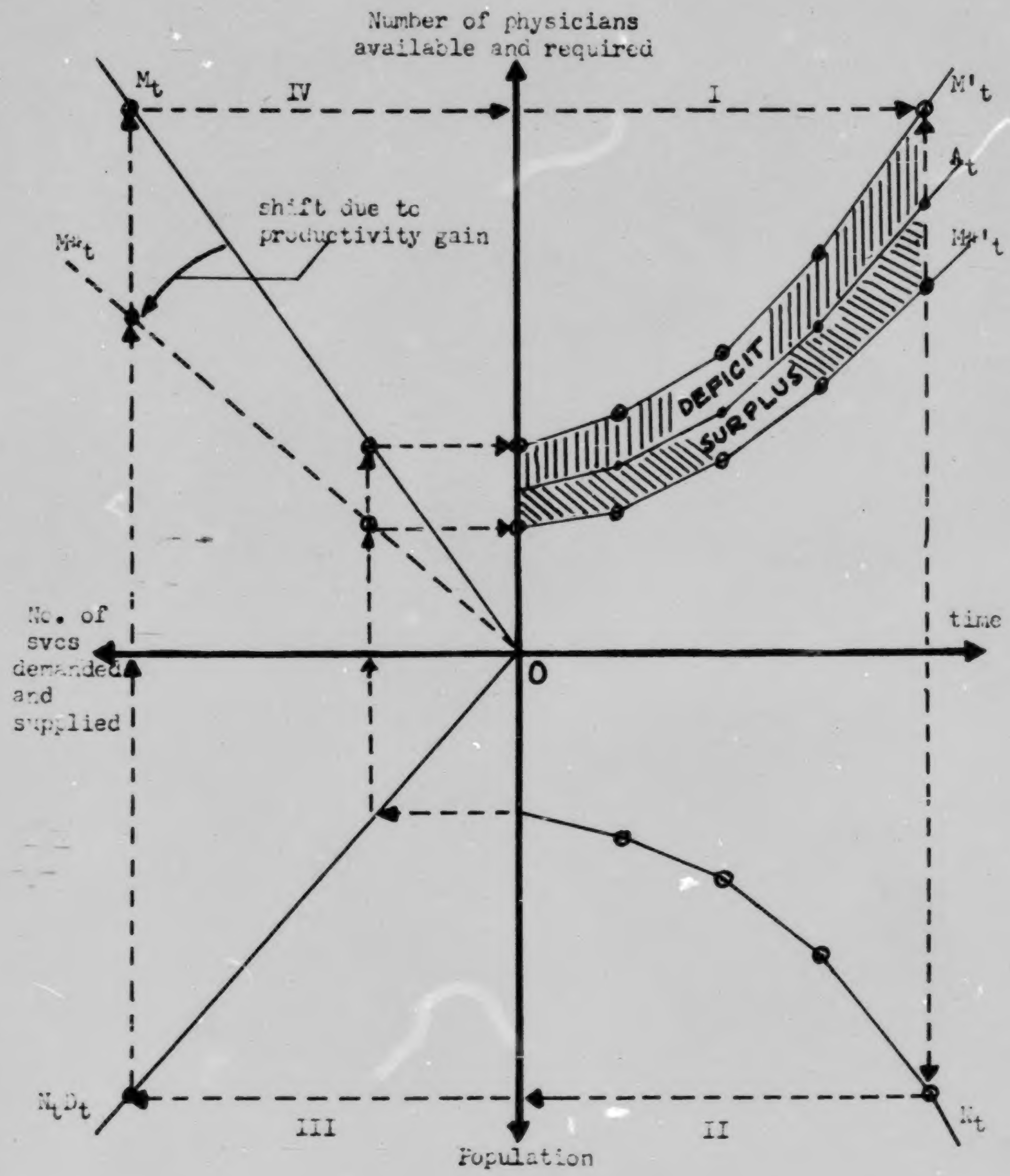
Obviously, the first step in the development of any health manpower forecast is a projection of the population to be served at various times in the future. The procurement of such projections is no problem; they are regularly updated and published by the Bureau of the Census. Indeed, to cover all conceivable contingencies, the Census Bureau typically provides one with an entire set of alternative population projections ranging all the way from Series A to Series F. The health manpower forecaster merely needs to pick out the most accurate projection from this rich offering. (Line N_t in quadrant II of Figure 1 is thought to be one such choice.) Even during this very simple first step, however, a forecasting error can obviously creep into the analysis if the wrong series is selected.

Step two in developing a health manpower forecast is the translation of the population forecast into an estimate of the aggregate demand for "physician services." At the tautological level, this aggregate demand is given by the product N_tD_t, where D_t denotes the estimated average per-capita demand for physician services in year t. D_t, as is well known, depends in the first instance on the demographic composition of the population to be served. In addition, it is strongly influenced by an entire set of socioeconomic variables, among them the average per-capita income and the income distribution in year t, and the net price that consumers bear each time they avail themselves of physician services. There is persuasive evidence that D_t tends to vary positively with income and negatively with the price consumers pay for physician services.

In principle, it ought to be possible to express D_t as a function of all pertinent influences on health-care consumption and to estimate the parameters of that "demand function" statistically. D_t could then be projected simply by projecting each of these explanatory variables separately and by inserting these projections into the estimated demand function. In practice, this task has proved to be enormously difficult. First, there is the problem of developing a meaningful definition of a "unit of physician services." In the past, researchers have typically resorted either to the "patient visit" or to an output index measured by expenditures on physician services. In addition, it has so far been almost impossible to obtain the requisite empirical data for estimating a health-care demand function. Relief in this area is, of course, on the way; the government has recently allocated some $50 million to the task of generating the required data.[1] At this time, however, even the best of our epidemiologists

FIGURE 1

A Rudimentary Health Manpower Forecasting Model


Number of physicians available and required
M_t
IV
I
M'_t
A_t
shift due to productivity gain
M^*_t
$M^{*\prime}_t$
DEFICIT
SURPLUS
No. of svcs demanded and supplied
time
O
N_tD_t
III
II
N_t
Population

and economists would be hard put to provide a reliable estimate of D_t ten or twenty years hence. Quite probably such estimates will always be accompanied by large standard errors, even under the best of circumstances.

If one has boldly projected a future time path of the aggregate demand for physician services (e.g., line N_tD_t in quadrant III of Figure 1), one next faces the task of translating this demand forecast into the required number of physicians rendering patient care (line M_t in quadrant IV). Mathematically, this number is given by the ratio $M_t = N_tD_t/Q_t$, where Q_t denotes the average annual output of physician services per physician rendering patient care--that is, the "average annual physician productivity" in year t. (It should be obvious that this productivity factor determines the slope $[1/Q_t]$ of line M_t in figure 1.) In principle it is possible to express Q_t in terms of its determinants as well, and to estimate the parameters of this so-called "production function" statistically. In the case of physicians rendering patient care, for example, these determinants may include the setting (group or solo practice) in which the typical physician operates, the medical equipment at his disposition (in both his own practice and the hospital), and the number of auxiliary personnel supporting him. Efforts to estimate production functions in these variables have been made for a good many years now, and not without some success. Even so, at this time one can at best only project alternative time paths of Q_t that appear to be technically feasible. Which of these technically feasible paths the average American physician will eventually follow depends in large part on his economic behavior, and the latter is not yet sufficiently well understood to permit accurate forecasting in this area. Once again, then, the translation of projected aggregate demand into the corresponding health manpower requirements remains a risky venture.

The final component of one's health manpower forecast is a projection of the supply of manpower actually available at various times in the future. In the case of medical manpower, this number depends on the present and future capacity of medical schools, on the rate of net immigration of foreign-trained physicians into this country, on the physicians' labor force participation, on the proportion of professionally active physicians actually rendering patient care as their primary activity, and on the rate of attrition through death. Each of these factors may, of course, vary in less than predictable fashion over time.

Given some forecast of the future supply of manpower--e.g., line A_t in quadrant I of Figure 1--the predicted shortage or surplus at various times in the future is given by the mathematical expression

$$(1) \qquad X_t = a_tc_tS_t - (D_t/Q_t)N_t$$

where, in addition to the already familiar symbols, S_t denotes the projected number of physicians living in year t, a_t is the percentage of living physicians who will be professionally active, c_t is the percentage of active physicians actually rendering patient care, and X_t denotes either a surplus ($X_t > 0$) or a shortage ($X_t < 0$). In quadrant I of Figure 1, X_t is shown as the vertical distance between lines M'_t (projected physician requirements) and line A_t (projected supply). If any of the lines in quadrants II, III and IV were slightly moved, line M'_t would more correspondingly, and so would X_t. Equation (1) can be used to illustrate the sensitivity of these projections to changes in the underlying variables.

Ratio $R_t = D_t/Q_t$ in equation (1) will be recognized as the familiar physician/population ratio, in terms of which estimates of future physician requirements have traditionally been made. (For the moment, the term "physicians" includes only those actually rendering patient care.) If one defines future requirements on the basis of some constant physician population ratio, one obviously assumes either that D_t and Q_t will remain constant over time or that both will grow at the same rate over time. Actually, neither assumption may be warranted, and it turns out that future physician requirements are highly sensitive to any difference in the growth rates of D and Q.

Figure 2 illustrates this point with a numerical example. On the horizontal axis is represented the difference between the long-run average annual growth rate in physician productivity (denoted by q) and the corresponding growth rate in the per-capita demand for physician services (d). On the vertical axis is plotted the required physician-population ratio

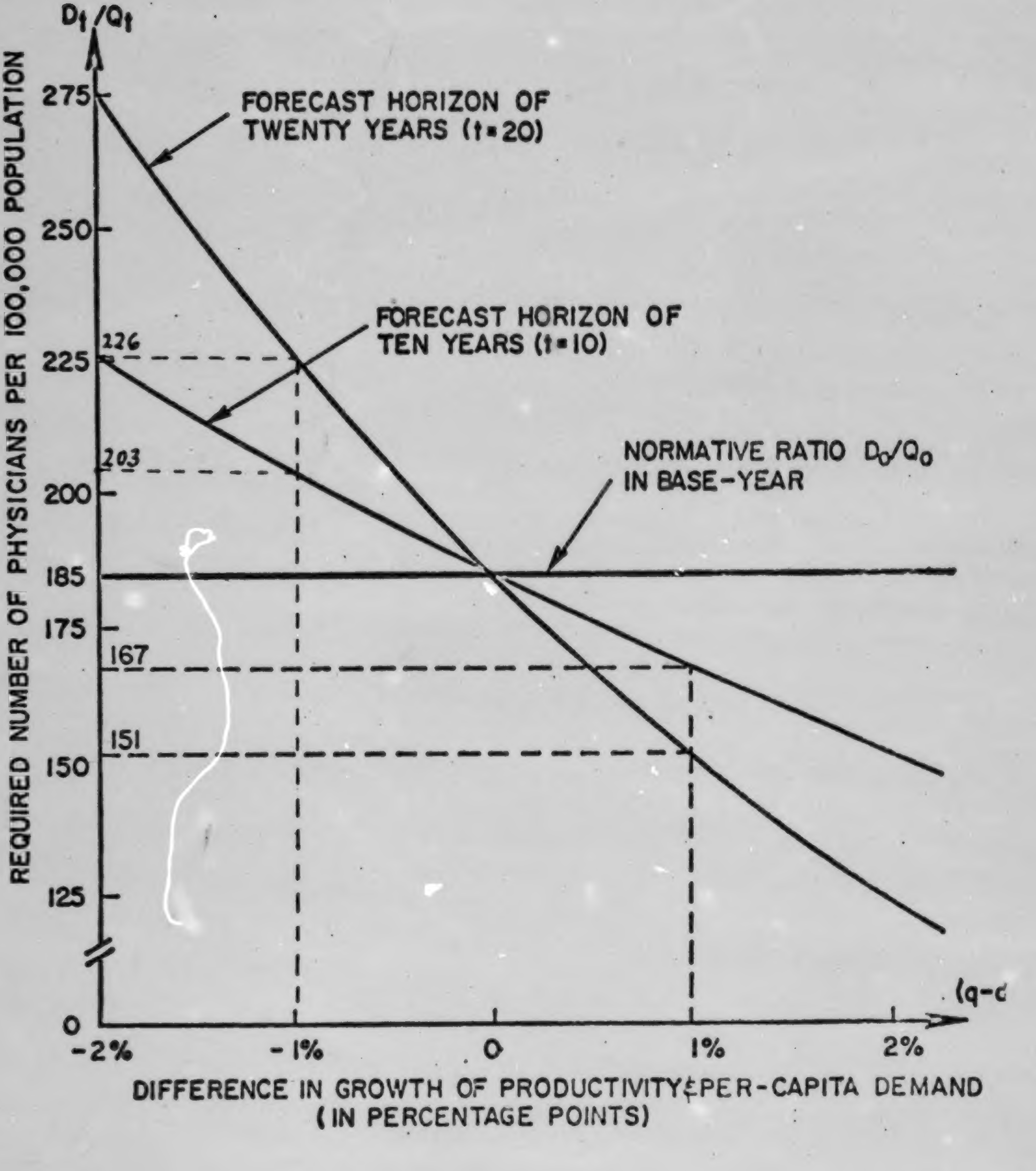
$$R_t = \left(\frac{D_o}{Q_o}\right) e^{-(q-d)t} \qquad (2)$$

implied by particular combinations of the two growth rates d and q. The base-year physician population ratio (D_o/Q_o) in figure 2 is taken to be 185 physicians per 100,000 population, a ratio broadly representative of some of the better-endowed New England states during the early 1970s. The steeper of the two curves in the diagram corresponds to a forecast horizon of t = 20 years, the flatter to a horizon of t = 10 years. The slopes of these curves indicate the sensitivity of predicted manpower requirements to assumptions about the relative values taken on by the two growth rates d and q.

If per-capita demand (D_t) and physician productivity (Q_t) could be expected to grow at the same rate over time--an assumption frequently built into health manpower forecasts--then the required physician/population ratio would of course remain at 185 per 100,000 during the entire forecast horizon. On the other hand, if in the base year a set of policies was implemented to raise the average annual growth in physician productivity during the following two decades by one percentage point over the annual growth in the per-capita utilization of physician services, then the required ratio at the end of the forecast horizon would have been only 151 physicians per 100,000 population. Relative to a forecast based on maintenance of the base-year ratio of 185 per 100,000 and for a population of roughly 250 million twenty years hence, this turn of events would have led to a reduction of about 85,000 in the number of M.D.s that would otherwise have been "required." The corresponding number for a horizon ten years hence, based on a projected population of 225 million, is 40,500. Precisely the obverse would be the case if per-capita demand outgrew physician productivity by one percentage point per year. These figures are clearly not insignificant when compared to the annual number of medical school graduates (between 15,000 and 16,000) likely to be produced during the next several decades.

FIGURE 2

The Sensitivity Future Physician Requirements
to Growth in Physician Productivity



One could undertake similar exercises with any of the other variables included in the forecasting equation (1) to test for the sensitivity of X_t to empirically relevant changes in one's assumptions about the future behavior of these variables. Enough has surely been said, however, to demonstrate the rather tenuous nature of any particular point estimate of X_t. Quite reasonable differences of opinion concerning the future behavior of the underlying variables could easily explain the seemingly inconsistent manpower projections presented in Table 1. Unfortunately, little is gained by such reconciliations, for they are of little help to policy-makers charged with the task of reacting to one particular number.

It should be emphasized that the model just examined is really but a small segment of a full-fledged health manpower model. In particular, it will have been noted that the future time path of physician productivity (Q_t) is, inter alia, a function of the future supply of physician-support personnel. The latter also is a type of manpower under the purview of health manpower policy. This interdependency among types of health manpower obviously should be explicitly acknowledged in one's forecast. Table 2 illustrates an extended forecast of this sort. The unit of output underlying this table is the patient visit at a physician's office, a unit of physician output widely employed in analyses of physician productivity and one on which data are regularly published by Medical Economics, Inc., by the American Medical Association, and by the National Center for Health Statistics. Table 2a indicates alternative cost estimates associated with the manpower combinations shown in Table 2.

According to estimates published by the American Medical Association,[2] the average number of office visits produced in 1970 per office-based patient-care physician in the United States was 4,820. The average number of aides per physician employed in medical practices was estimated to be roughly 1.75 in that year.[3] Using these figures as a baseline, the second line of Table 2 indicates the average numbers of office visits per physician that, according to a recent production-function estimate for physician office visits,[4] could have been produced with averages of from zero to four aides per physician.[5] Line 3 of Table 2 converts these estimates into a productivity index set to unity at the observed 1970 average of 1.75 aides per physician.

The remaining lines in Table 2 indicate alternative estimated combinations of medical and physician-support personnel capable of producing given projected rates of aggregate demand for office visits. The first pair of lines shows estimated manpower requirements for the base year, in this case 1970. The next pair indicates alternative manpower mixes capable of meeting the demand for office visits in 1990 if the per-capita demand for visits remained constant over the period 1970-90. Finally, the third pair suggests manpower requirements in 1990 if between 1970 and then the per-capita demand for visits were to grow at an average annual rate of 3 percent. The population figures underlying these estimates are taken from the most recent Series E published by the U.S. Bureau of the Census.[6]

Although Table 2 is intended to be merely illustrative, an effort has been made to tailor the assumptions underlying that table as closely as possible to reality. The estimates presented in these displays can therefore be taken as rough and ready guides to technically feasible health man-

TABLE 2

Estimated Technically Feasible Trade-Offs Between Office-Based M.D.s and Support Personnel United States, 1970 and 1990[a]

	Number of M.D.s and Support Personnel Required if the Number of Aides per M.D. (L) is equal to:					
	0	1	1.75	2.0	3.0	4.0
Estimated Annual Rate of Office Visits per M.D.[b]	2,850	3,391	4,821	5,124	6,311	7,345
Index Set Equal to 1.00 for L=1.75	.59	.82	1.00	1.06	1.31	1.52
1970						
Size of Resident Pop.: 204 mil.						
Avg. Ann'l Visits per Capita: 4.6[c]						
No. of M.D.s required ('000s)[d]	326	236	192	181	147	126
No. of Aides required ('000s)	0	236	337	362	441	505
1990						
Size of Resident Pop.: 245 mil.[e]						
a) Zero Growth in per Capita Demand:						
Avg. Ann'l Visits per Capita: 4.6						
No. of M.D.s required ('000s)	391	283	231	217	176	152
No. of Aides required ('000s)	0	283	404	434	529	606
b) Ann'l Growth in per Capita Demand: 3%						
Avg. Ann'l Visits per Capita: 8.3						
No. of M.D.s required ('000s)	712	516	421	396	321	276
No. of Aides required ('000s)	0	516	736	792	964	1,104

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[a] Based on the assumption that physicians in 1970 employed the equivalent of the time of 1.75 aides each.

[b] Based on the productivity index for the office-visit equation from the sample of internists.

[c] Office visits only.

[d] Office-based M.D.s rendering patient care.

[e] U.S. Bureau of the Census (1972), Series E.

TABLE 2a

Illustration fo the Effect of Health Manpower Substitution on the Direct Costs of Furnishing an Assumed Aggregate Demand for Office Visits in 1990.[a]

Assumed average annual salary per aide, and assumed contribution to non-labor overhead and net profit per hour the physician spends in his office.	Total Cost and Cost per Office Visit If the Number of Aides per physician is Equal to:					
	0	1	1.75	2	3	4
Salary per aide: $7,500						
Contribution margin per hour:[e]						
	Total costs (billions of dollars)[b]					
$20	23.91	21.20	19.65	19.23	18.03	17.56
30	35.87	29.87	26.72	25.88	23.43	22.20
40	47.82	38.54	33.79	32.53	28.82	26.84
	Average cost per office visit[c]					
$20	11.79	10.45	9.69	9.48	8.89	8.66
30	17.69	14.73	13.18	12.76	11.55	10.95
40	23.58	19.00	16.66	16.04	14.21	13.23
Salary per aide: $10,000						
Contribution margin per hour:						
	Total costs (billions of dollars)					
$20	23.91	22.49	21.50	21.21	20.44	20.32
30	35.87	31.16	28.56	27.86	25.84	24.96
40	47.82	39.83	35.63	34.51	31.23	29.60
	Average cost per office visit					
$20	11.79	11.09	10.60	10.46	10.08	10.02
30	17.69	15.36	14.08	13.74	12.74	12.31
40	23.58	19.64	17.57	17.02	15.40	14.60
Salary per aide: $15,000						
Contribution margin per hour:						
	Total costs (billions of dollars)					
$20	23.91	25.07	25.17	25.18	25.26	25.85
30	35.87	33.74	32.24	31.82	30.66	30.48
40	47.82	42.41	39.31	38.47	36.05	35.12
	Average cost per office visit					
$20	11.79	12.36	12.40	12.41	12.45	12.74
30	17.69	16.64	15.90	15.69	15.12	15.03
40	23.58	20.91	19.38	18.97	17.78	17.32

---

[a] Calculated from the manpower requirements presented in Table 2 on the assumption that the per-capita demand for office visits will grow at a steady annual rate of 3 percent. The costs shown in the table include only the office-based part of the physician's income; income earned in the hospital is thought to be excluded. It is assumed that the physician will spend an average of 35

(continued)

Table 2a, continued

hours per week in his office (not necessarily in direct contact with patients) and work an average of 48 weeks a year.

[b] Calculated as X = CHM+SML, where X is total cost, C is the assumed contribution margin per hour, S is the assumed annual salary per aide, L is the number of aides per office-based physician, M is the required number of office-based physicians, and H is the total number of office hours per year.

[c] Calculated as P = X/(ND), where P is average cost per visit, X is total cost (as defined in (b) above), N is the size of the population to be served and D is the per-capita demand for office visits.

[e] Defined as gross revenue minus outlays on auxiliary personnel, per hour the physician spends in his office.

power trade-offs actually faced by policy-makers. It may be noted that for a given aggregate demand, the physician requirements shown in Table 2 are functions solely of the postulated productivity gains, regardless of how these gains are achieved. The estimated requirements of support personnel, on the other hand, reflect the assumption that the postulated productivity gains (or losses) are brought about by changing the number of full-time equivalent aides per physician from a base value of 1.75 to whatever number is indicated at the top of the table. Here it may be noted that the category of aides considered in these calculations includes only the so-called "traditional" allied health workers--registered nurses, technicians, and office aides. If the physicians' support personnel actually included a substantial number of more highly trained "physician extenders," the required number of support personnel would probably be somewhat smaller than those indicated in the table. For example, a 50 percent increase in physician productivity over current levels might readily be achievable with merely two traditional aides and one physician extender.

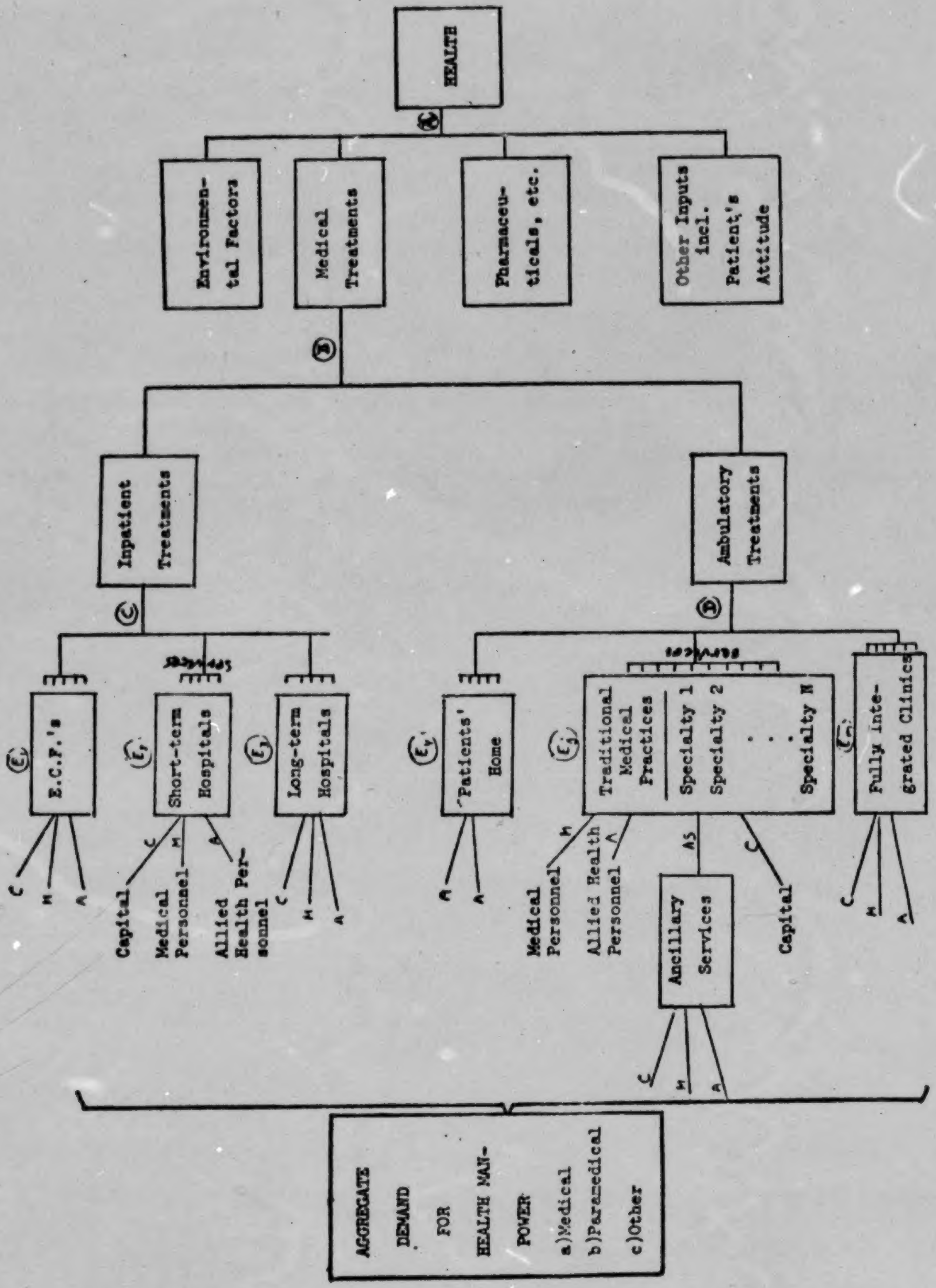
Even the extended forecasting exercise illustrated in Table 2 presents only a partial picture of the health manpower sector. It abstracts entirely from certain interdependencies between the activities of office-based physicians and other parts of the health-care sector. These interdependencies are sketched out in rough and ready fashion in Figure 3.[7] That diagram identifies the chain of links between the consumers' demand for "better health" and the derived demand for medical and allied health manpower.

Figure 3 serves to emphasize the inherent looseness of the overall relationship between the health needs of a given population and the derived demand for health manpower capable of ministering to those needs. Thus it is assumed that "better health" or "health maintenance" results from a production process in which "medical treatments" are but one input, and in which substitution among inputs (e.g., medical treatment and housing) is technically feasible (link A). Medical treatments, in turn, may be provided either on an inpatient or an ambulatory basis. As is well known, within limits these two types of treatments may be substituted for one another without harm to the patient (link B). In the provision of inpatient treatments, trade-offs are technically feasible among distinct types of provider facilities--for example between hospitals and extended-care facilities (link C). Since each type of provider facility tends to have a distinct staffing pattern, such trade-offs among institutions also implicitly are trade-offs among distinct types of health manpower. A similar observation can be made in connection with ambulatory care facilities (link D). Finally, certain trade-offs among types of health manpower also are technically feasible within each provider facility (links E_1 to E_m). In Table 2, for example, such trade-offs were illustrated numerically for private medical practices. They should also be possible within hospitals and extended-care facilities, although empirical information in this area is very thin.

Ideally, a health manpower forecaster should have empirical information on all of the technically feasible trade-offs enumerated above. It is not difficult to write down a series of mathematical expressions thought to characterize these trade-offs at the theoretical level. The problem so

FIGURE 3

Illustrative Summary of the Health Manpower Forecasting Model


HEALTH
A
Environmental Factors
Medical Treatments
Pharmaceuticals, etc.
Other Inputs incl. Patient's Attitude
B
Inpatient Treatments
Ambulatory Treatments
C
D
services
services
E.C.F.'s
Short-term Hospitals
Long-term Hospitals
"Patients' Home
Traditional Medical Practices
Specialty 1
Specialty 2
Specialty N
Fully Integrated Clinics
C
M
A
Capital
Medical Personnel
Allied Health Personnel
M
A
AS
C
Ancillary Services
AGGREGATE DEMAND FOR HEALTH MANPOWER
a)Medical
b)Paramedical
c)Other

far has been to flesh out that framework with reliable estimates of its parameters. Even if such estimates were one day available, however, it is clear that they would at most enable the one to identify alternative overall health manpower combinations *technically* capable of meeting a projected demand for medical treatments. Such projections of the technically feasible may include, but would not by itself indicate, the particular health manpower combinations likely to be used by the health care sector ten, twenty, and thirty years hence. Yet it is precisely such point estimates one needs for a health manpower policy seeking merely to react to predicted manpower shortages or surpluses. To make such point estimates, one clearly needs reliable empirical information not only on the technically feasible trade-offs described above, but also on the *economic* behavior of the various decision-makers in the health industry. In other words, one must superimpose on the framework sketched out in Figure 3 a behavioral model of the entire health-care sector.

Economists are now busily engaged in estimating various parts of a wider health-sector model. Sooner or later they may well be able to offer, a fairly reliable and completely integrated version of such a model. The question nevertheless remains whether the point estimates that could be produced with such a model are in fact the best contribution health manpower forecasters can make to the process of policy formulation. That question will be addressed at greater length in the conclusion to this paper, after an examination of health manpower forecasting and policy during the recent past.

III. Health Manpower Forecasting and Policy in the United States: Recent Experience and Some Current Issues.

Health manpower forecasting in practice. With few exceptions, health manpower forecasting during the past decades has proceeded on simplified versions of the already fairly simple forecasting equation (1) above. The predominant form of the model has been an equation such as

$$(2) \qquad M_t = \overline{R} \cdot N_t$$

where M_t denotes the required number of some type of health manpower in year t, N_t is once again the population to be served, and $\overline{R}$ is some target manpower-population ratio, either the national average prevailing at the time of forecast, or, more commonly, the ratio then prevailing in the most favorably endowed region of the United States. To the author's best knowledge, the interdependence among types of health manpower has never been formally incorporated into any health manpower forecast. The procedure has been to project requirements for each type of manpower separately and in abstraction from all other types of health manpower.

In all fairness it must be mentioned that, where the ratio approach has been employed, it has invariably been accompanied by profuse apologies for its simplicity. Such apologies generally do shield their authors from ill repute. Unfortunately, they do not necessarily protect the nation from following an excessively costly health manpower policy. As may be seen on comparing equations (1) and (2), the ratio approach obscures from view some crucial assumptions about the definition of health-care requirements (D_t in equation (1)) and about the organization of the health care provider system (which would reflect itself in variable Q_t of equation (1)). These assumptions warrant explicit treatment.

Economists generally estimate health manpower requirements as a derivative of the "effective demand" for health services. Effective demand in this context is thought to be the need for health services as perceived by consumers and backed up by an ability and willingness to pay for health services. The inherent advantage of this criterion is that it is objectively defined and measurable, at least in principle. Unfortunately, it is inconsistent with the notion that access to all necessary health care is a basic human right regardless of individual consumers' ability to pay. For that reason it has been common practice to project future health manpower requirements on the basis of "medical need" rather than effective demand. As long as the distribution of purchasing power in this country remains as uneven as it is today, this is probably as it should be. The problem from a methodological standpoint is that the concept of medical need is highly subjective, even among physicians whose notion of need is undoubtedly colored by the cultural and socio-economic milieu in which they happen to practice.

As noted, the practical solution to this problem among health manpower forecasters has frequently been to take the health manpower/population ratios observed in the most highly endowed region (usually one or all of the New England states) as the culturally relevant standard for the nation as a whole. A very explicit application of this solution, for example, can be found in Edward Yost's The U.S. Health Industry: The Cost of Acceptable Medical Care by 1975 (1969). In that analysis Yost develops an estimate of national health manpower requirements for 1975, using the "basic need" equation

$$(3) \qquad Y = X + \Delta X$$

where Y is the ratio of physicians, of dentists, of nurses, and so on, to the population of Westchester County, New York (home of many executives and professionals working in New York City), X is the corresponding ratio for the United States as a whole, and ΔX is the change in X required to bring the United States up to Westchester County standards, the latter being Yost's definition of "basic need." (Incidentally, using this equation Yost projects a required national aggregate of 492,000 physicians by 1975 and suggests (in 1969) that 142 additional medical schools of standard size would have to be built to attain that target.) Most other health manpower forecasts, although adopting varying norms for $\overline{R}$, have followed this basic methodology. Among the notable exceptions are the more elaborate forecasts prepared by Rashi Fein (1967), by the National Advisory Commission on Health Manpower (1967), and by George Monsma (1968), each of whom projects the demand for services (D) and the supply of services per provider (Q) separately.

It should be obvious that, as long as there are inter-regional differences in health manpower endowments, a definition of medical need based on the most favorably endowed regions virtually guarantees one continued escalation in estimated future manpower requirements. Such escalation can in fact be discerned in the history of manpower forecasting in this country. For example, if the time path of the actual physician supply in past years is compared with requirements projected earlier for those years, one notes that actual supply typically has come close to or even exceeded projected requirements. (See, for example, Table 1.) Oddly enough, this fortunate turn of events has never been a source of satisfaction, for in the meantime the definition of requirements was changed and new manpower forecasts were issued, each pointing either to an existing or an impending physician shortage. The historical pattern seems to conform to the motto "plus ça change, plus C'est la même chose."[10]

One might think that successive additions to the aggregate stock of a given type of manpower--for example physicians--would eventually help to erode inter-regional differences in manpower-population ratios. For some types of health manpower this may well be the case. In the case of medical manpower, however, all evidence suggests that such differences will persist almost regardless of the aggregate supply of physicians. It follows that as long as the manpower ratios of the more favorably endowed states are taken as norms for the United States as a whole, just so long will there be reports of health manpower shortages. These reports will be all the more believable if the locational decisions of health workers leave some locations truly underserved or some specialties truly understaffed.

Quite aside from the potential to escalate per capita "requirements" of medical services, the use of physician/population ratios in highly endowed regions as national standards can lead to problems of yet another sort. It is obvious from the definition of $\overline{R}$ in equation (2) that a state or region may have a relatively high physician/population ratio either because its residents enjoy a relatively high per-capita utilization of physician services--variable D in equation (1)--or because the average annual output per physician (Q) is relatively low, or because of a combination of both factors. In this connection the data in tables 3 and 4 are illuminating. Table 3 presents, for three of the nine United States census divisions, data on relative physician/population ratios, data on the organization of and output from private medical practices, data on per-capita utilization of physician services, and on physician fees and incomes. As far as relative endowment with medical manpower is concerned, the three census divisions in Table 3 represent, respectively, the most highly endowed, a moderately well endowed, and the most poorly endowed divisions in the United States. Table 4 shows data similar to those exhibited in Table 3 except that the "regions" are metropolitan areas of different sizes. This table is added to corroborate the data in Table 3.

The pattern exhibited by tables 3 and 4 is revealing. In regions or locations with relatively high physician/population ratios, the average physician appears to work relatively fewer weeks per year and appears to see relatively fewer patients per week, so that his value for Q is relatively low. The lower value of Q, however, does not reflect itself fully in a lower physician income, for it is offset to a large extent by higher fees per patient visit. Physicians in relatively poorly endowed regions do not appear to rely more heavily on support from hospital facilities than do their colleagues in more highly endowed regions; instead, physicians in the poorer regions tend to employ relatively more support personnel in their practices and tend to have a higher preference for group practices, a setting sometimes thought to enhance the productivity of all types of health manpower. Finally, it would appear from the data in Table 3 that

TABLE 3

Regional Differences in Certain Health-Care Statistics
United States, 1969-70

(Figures in parentheses are indices based on New England as 1.0)

		- Census Divisions -		
	Year	New England	East-North Central	East-South Central
1. Number of active M.D.s involved in patient care as their primary activity, per 100,000 population	'70	161 (1.00)	115 (0.71)	95 (0.59)
2. Average annual number of hours worked per M.D.[a]				
a) total practice hours	'69	2504	2495	2568
b) hours of direct patient care	'69	2128	2151	2303
3. Average annual number of patient visits per M.D.				
a) total patient visits	'69	4808 (1.00)	6611 (1.38)	8408 (1.75)
b) office visits only	'69	3384 (1.00)	4799 (1.42)	6052 (1.79)
4. Total visits per hour[b]				
a) total visits per practice hour	'69	1.92	2.65	3.27
b) total visits per hour of patient care	'69	2.25	3.07	3.65
5. Average number of auxiliary personnel employed per physician	'67	1.3	1.8	2.1
6. Percentage of physicians in group practice	'69	9.3%	17.4%	19.4%
7. Average fee for a routine follow-up office visit	'70			
a) general practice		$6.79	$6.29	$5.21
b) internal medicine		$9.40	$8.05	$7.20
c) pediatrics		$7.53	$6.94	$5.40
d) general surgery		$9.76	$7.76	$6.85
e) obstetrics/gynecology		$9.77	$9.32	$7.60
8. Average net income (all specialties)	'70	$38,019	$47,000	$41,963

(continued)

Table 3, continued

	Year	- Census Divisions - New England	East-North Central	East-South Central
9. Reported number of physician-patient visits				
a) based on survey of physicians	'69			
--total patient visits		7.7	7.6	8.0
--office visits only		5.4	5.5	5.8
b) based on household surveys[c]	'70	4.4	4.0	4.1
10. Infant mortality rate[d]	'68			
a) white		19.2	19.4	20.9
b) non-white		31.8	35.4	40.5
11. Socio-economic indicators	'70			
a) personal per capita income		$4,469	$4,306	$3,146
b) percantage of population with:				
--no school years		1.5%	1.1%	2.5%
--less than 4 school years		3.9%	4.0%	12.5%
--less than 6 school years		8.9%	8.6%	22.2%
c) percentage of all-year housing that has:	'70			
--no piped water		0.6%	1.3%	10.10%
--no flush toilet		1.3%	2.4%	14.9%
--no bathtub or shower		2.6%	3.3%	16.2%
--more than 1 person/room		6.2%	7.2%	11.2%

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[a] Reported average number of hours worked per week x reported average number of weeks worked per year.

[b] Line 3a divided by lines 2a or 2b.

[c] These figures are not for the census division proper, but for the North-Eastern, North-Central and Southern census regions.

[d] Number of deaths of infants under 1 year of age per 1,000 live births.

SOURCE: Reinhardt (1974b), Table 2-5.

TABLE 4

Physician/Population Ratios, Patient Loads, and Medical Fees by Size of County

United States, 1970

Demographic County Classification[a]	Physician/ Population Ratio[b]	Weekly Patient Visits		Fee for an Initial Office Visit
		Total	Office	
NON-METROPOLITAN:				
10,000-24,999	51	223	167	7.15
25,000-49,999	64	217	164	7.13
50,000 or more	87	192	153	7.96
METROPOLITAN:				
50,000- 499,999	107	194	150	8.65
500,000- 999,999	141	167	140	9.33
1,000,000-4,999,999	150	138	114	9.00
5,000,000 or more	191	124	109	10.34

[a] Numbers refer to inhabitants

[b] Number of non-federal physicians inpatient care per 100,000 resident population as of December 31, 1970.

SOURCE: Reinhardt (1974), Table 2-6.

the total number of patient visits per member of the resident population (one possible proxy for variable D in equation (1) is roughly the same in all three census divisions. One arrives at this conclusion whether one bases it on visits as reported by physicians or on visits as reported by patients themselves. This conclusion is consistent also with a study of American pediatricians by Yankauer et al., in which it was found that southern pediatricians delegate substantially more routine medical and clerical tasks to auxiliary personnel than do pediatricians in the New York metropolitan region (1970, p. 36). The analysis further revealed that pediatricians in the South tend to put in an average of 40 practice hours per week, compared to an average of 28.5 hours spent by their colleagues in New York.

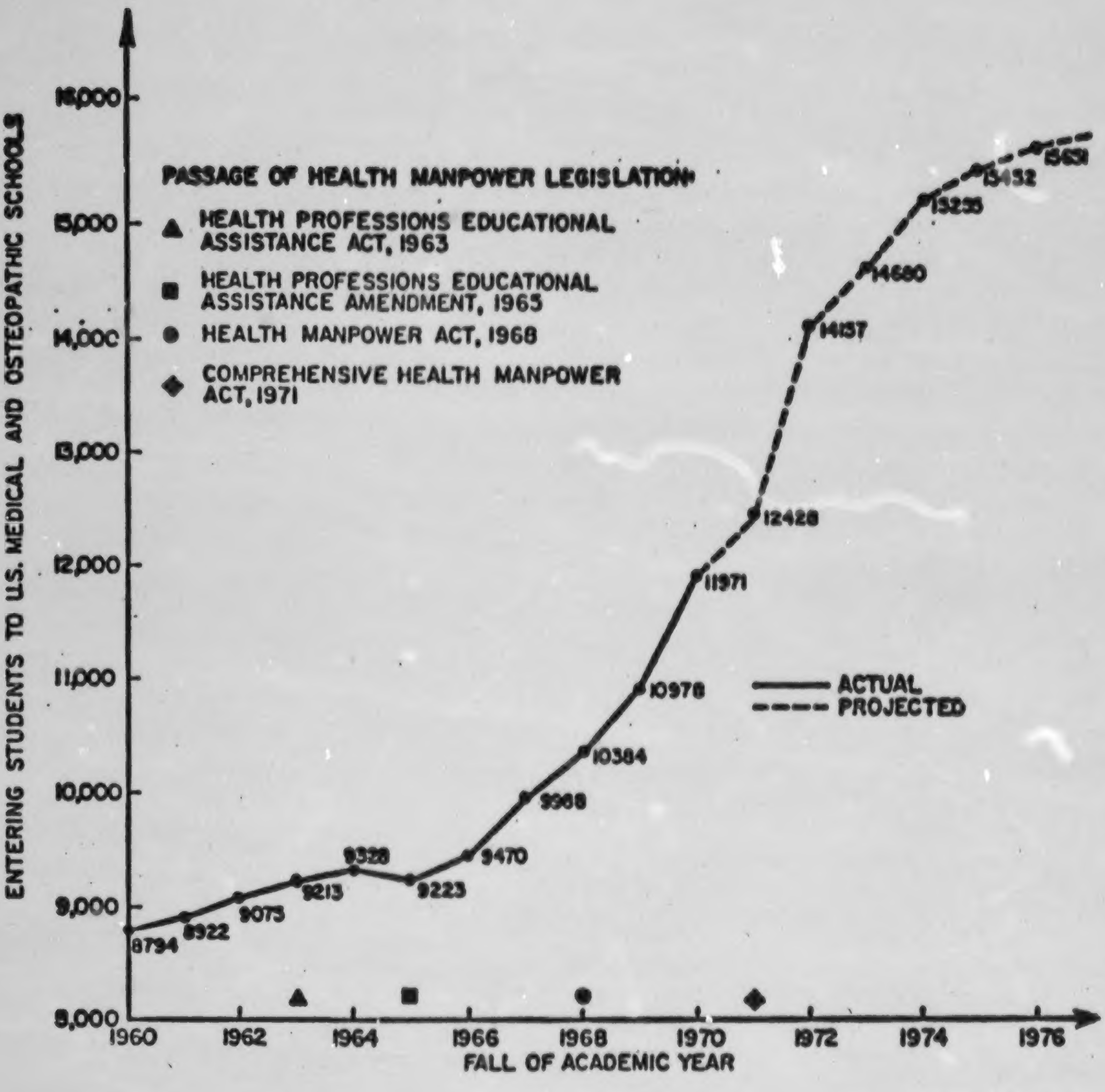
It must be kept in mind, of course, that "patient visits" are not a homogeneous commodity and that the data in the tables may reflect more than meets the eye. On some health indices--for example,tthe infant mortality rate--the New England and East North Central states fare better than the East South Central states. Thus, the argument could be made that the "quality" of care southern physicians dispense per patient visit is inferior to that dispensed by their Northern colleagues. But here also great care must be exercised in the interpretation of the data, lest effects properly attributable to the socio-economic environment of patients be inadvertently credited or debited to physicians. As is shown in lines 11 and 12 of Table 3, levels of education, of income, and particularly of housing conditions in the South tend to be inferior to those found in the North. These factors also may reflect themselves in morbidity and mortality rates.

Proper measurement of the true value (health status) added by medical personnel in the various regions of the United States requires a rather more penetrating analysis than is intended here. Tables 3 and 4 have been presented mainly to raise the question: Just what is being proposed when the physician/population ratio of the most richly endowed region or state is proffered as the culturally relevant standard of physician density for the nation as a whole? Is it proposed that all Americans should enjoy the level of health care enjoyed by residents of the most highly endowed region? Or is it suggested that the comportment of physicians in the most highly endowed region be a standard for all American physicians? If it is the latter--and by proceeding in terms of physician/population ratios one inevitably offers that prescription--than tables 3 and 4 warrant at least the suspicion that by aiming for the highest prevailing physician/population ratio one may inadvertently proffer inefficiently organized and unnecessarily costly medical practice as a national standard. And that inefficiency receives official blessing if public health manpower policy responds passively though conscientiously to whatever dire predictions emerge from this forecasting methodology. It is conceivable that health manpower policy during the past decade or so has already been somewhat too accommodating to this respect. A review of recent policies concerning the supply strictly of medical manpower may serve to illustrate this proposition.

Health manpower policy and the aggregate supply of medical manpower. In 1959, the Surgeon General's Consultant Group on Medical Education--commonly referred to as the Bane committee--projected a deficit of 11,000 to 17,000 physicians for the year 1975. To cover this deficit, the Bane com-

FIGURE 4

Federal Health Manpower Legislation:
Impact on Medical School Capacity



mittee called for direct Federal support of medical education in addition to the Federal research funds that had traditionally flowed to medical schools. Calls for Federal assistance to medical education had preceded the Bane committee report on a number of occasions but had fallen on deaf ears in Congress. The political climate in the early 1960s, however, was more receptive to the idea of direct Federal intervention in the market for health manpower training. In 1963, Congress passed the Health Professions Educational Assistance Act, authorizing for the first time direct Federal support for the *teaching* activities of medical schools and for medical students themselves. The Act was extended and modified in a series of subsequent amendments, and accompanied by legislation supporting the training of allied health manpower. Under this legislation, several billion dollars of Federal support have been granted to health manpower training, the bulk being aimed at increasing the mere number of such personnel. As noted in the introduction to this paper, the authority under much of this legislation expires this year. Congress must now decide the shape of health manpower policy for the next decade or so.

Figure 4 suggests the response of medical school capacity to the massive influx of Federal funds into medical education under the HPEA program. It is seen that between 1964 and 1973 the size of the entering class in American schools of medicine and osteopathy increased by more than 60 percent, and further increases are expected even under existing legislation. Although some growth in medical school capacity was evident even prior to direct Federal assistance, the presumption is justified that much of the growth since 1965 is directly attributable to Federal assistance.

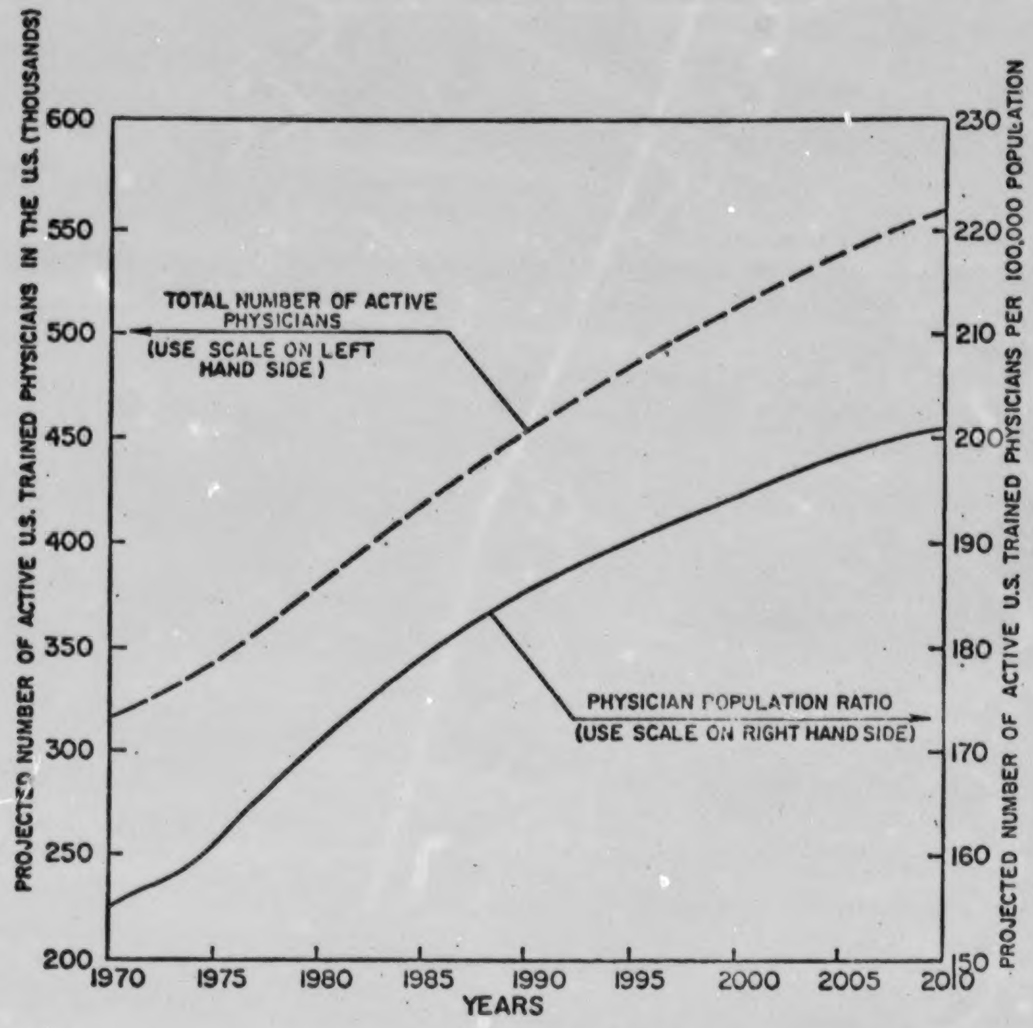
An expansion program of this sort has long-run effects that are not always fully appreciated. These effects are illustrated with the aid of figures 5 and 6. Figure 5 depicts the projected number of professionally active U.S.-trained physicians per 100,000 population likely to come forth from an overall medical school capacity constrained, for the remainder of the forecast horizon, to the expected 1975 level of roughly 15,500 entering students. This projection, it must be emphasized, includes only those foreign-trained physicians (FMGs) already part of the U.S. stock of physicians in 1970. From 1970 onwards, gross additions to the supply of physicians exclude any inflow of FMGs, primarily because it is anybody's guess what this flow will be. Figure 5 thus depicts what is likely to be achieved solely with U.S. medical school capacity. Since the inflow of FMGs has continued unabated during the early 1970s, Figure 5 is clearly an unrealistically conservative forecast.[11]

Figure 6 translates the supply projections of Figure 5 into an estimate of the number of U.S.-trained, office-based M.D.s (excluding doctors of osteopathy) per 100,000 population, and into the average number of office visits per capita likely to be produced by these physicians on the assumption (a) that there will be no future gains in physician productivity (the lowest of the three lines in figure 6) or (b) that physicians in the future will be supported by larger auxiliary staffs than were used in 1970 (a range of estimates represented by the shaded area between the upper two curves in Figure 6).

The projected physical number of office-based M.D.s per 100,000 popu-

FIGURE 5

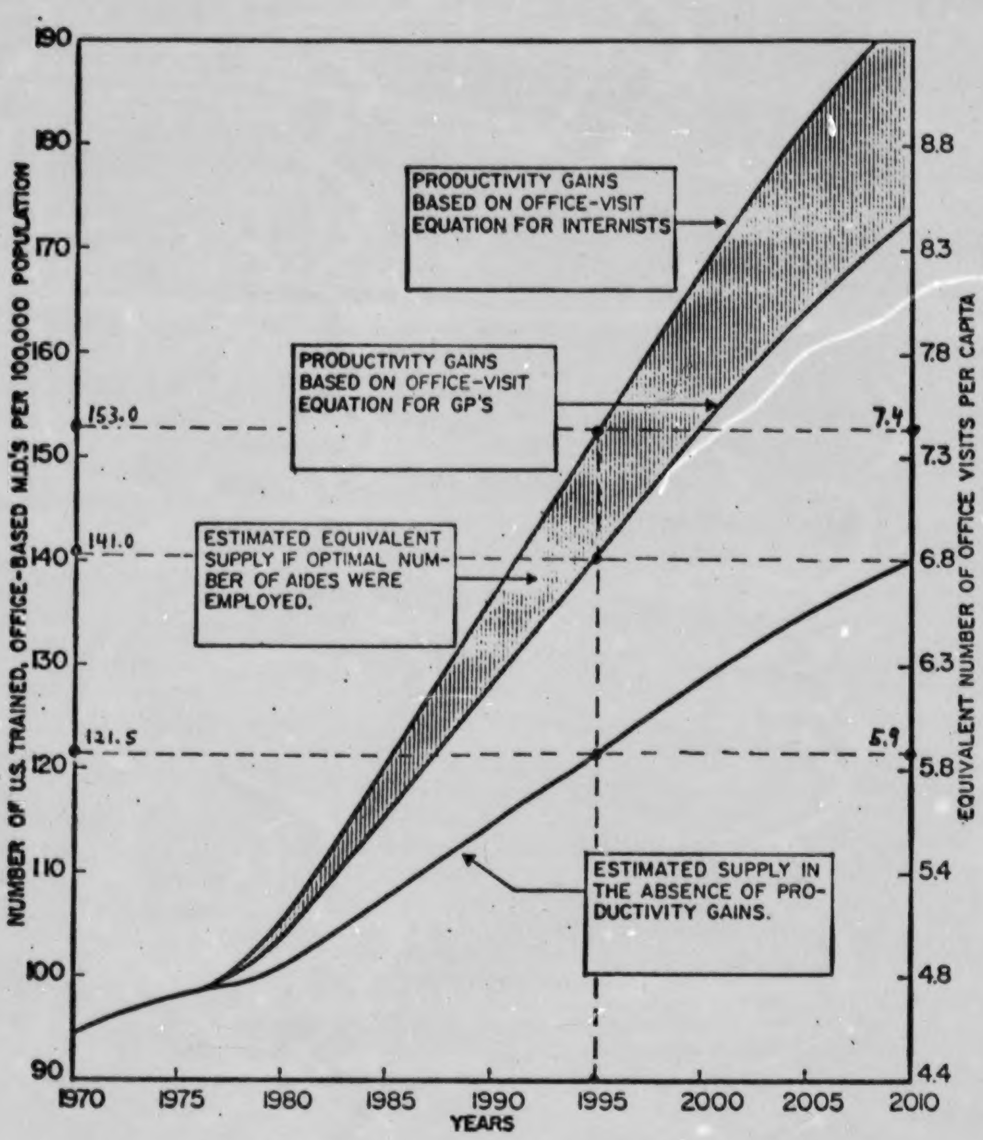
Projected Impact of Existing Health Manpower Legislation on the Supply of Active U.S. Trained Physicians, United States, 1970-2010



SOURCE: Reinhardt (1974b), Chapter 1.

FIGURE 6

Projected Impact of the Employment of an Optimum Auxiliary Staff on the Number of U.S. Trained Office-Based M.D.s per 100,000 Population and on the Supply of Office Visits per Capita, 1970-2010



SOURCE: Reinhardt (1974b), Chapter 7.

lation is represented by the lowest line in Figure 6 labelled "estimated supply in the absence of productivity growth." The M.D./population ratio corresponding to this line can be read off the left-hand scale of the diagram. On the right-hand scale is plotted the equivalent number of office visits per capita, obtained by multiplying the M.D./population on the left-hand scale by the average number of 4,821 office visits reportedly produced in 1970 per office-based M.D. (For further details on the assumptions underlying figures 5, 6, and also 7, the reader is referred to the original source.)

The shaded area enclosed by the top two lines in Figure 6 represents an estimate of the M.D./population ratio at 1970 productivity levels that would be equivalent to some point lying vertically below the area and on the lowest line if the physicians represented by the latter point employed four rather than an assumed two aides per physician and thus operated at a higher level of physician productivity. The two lines enclosing the area reflect alternative estimates of the associated productivity gains. The upper curve, for example, reflects the productivity estimates from a production function already embodied in Table 2, although in that table it was assumed that physicians in the base year employed an average of 1.75 rather than two aides per physician. The productivity indices underlying Figure 6 are therefore more conservative than those shown in row three of Table 2.*

As is seen from Figure 5, even without productivity gains, further additions to the capacity of American medical schools, or any inflow of foreign-trained physicians after 1970, the nation's aggregate physician/population ratio would increase throughout the remainder of this century

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*Lest Figure 6 be confusing, consider the year 1995. According to the lowest of the three curves, the projected physical number of office-based M.D.s per 100,000 population is roughly 121.5, as may be seen by following a vertical line from 1995 to the lowest of the three curves, and reading off the ratio corresponding to the intersection with that curve on the left-hand scale. In the absence of productivity gains, these physicians should be able to deliver an average of roughly 5.9 office visits per capita. On the other hand, if medical students were trained to work with four rather than the assumed traditional two aides per physician, the stock of physicians in 1995 would be more productive. According to the more pessimistic productivity estimate, such a staffing pattern would enable these 121.5 M.D.s per 100,000 population to deliver roughly 6.8 visits per capita. This may be seen by extending the vertical line originating at 1995 to the lower line enclosing the shaded area, and thence moving horizontally across to the right-hand scale. Now, to produce 6.8 office visits per capita *in the absence* of any productivity gains would have required not 121.5 but 141 M.D.s per 100,000 population, as will be seen by drawing a horizontal line from 6.8 visits on the right-hand scale to the ratio of 141 on the left-hand scale. In other words, 141 M.D.s per 100,000 population in the absence of productivity gains are equivalent to 121.5 M.D.s per 100,000 population after the productivity gains contemplated in the lower curve enclosing the shaded area. For the more optimistic estimate of the productivity gains associated with a staff of 4 aides per physician (the upper curve enclosing the shaded area), the equivalent of M.D./population ratio would be as high as 153.

and into the next century. The actual supply of physicians is, of course, likely to be higher still, for the inflow of FMGs continues apace. Figure 6 suggests that, unless there occurs an actual decrease in average physician productivity or an ever-increasing proportion of medical school graduates shun patient care activities for research or administrative posts, the number of physician services available per capita should increase by at least the rate reflected in the lowest line of Figure 6. The supply of services would increase even more rapidly if current efforts to provide physicians with added support personnel were successful. Success in this area, however, depends in the final analysis on the willingness of physicians to hire such support personnel.

As will be argued further on, the physicians' enthusiasm in this respect will depend on their economic circumstances. If the supply of physicians is ample and adequate incomes can be made in the absence of support personnel, the number of aides per physician is not likely to increase significantly over time. (In fact, between 1965 and 1970, the average number of aides per physician in private medical practice appears not to have increased at all.)[12] Alternatively, additional aides may be used to produce added ancillary services per episode of illness. Such a development would enhance the physicians' hourly earnings, it might or might not add to the quality of care, but it certainly would drive up the overall cost of health maintenance. One suspects that it may have been reflections of this sort that prompted Assistant Secretary for Health Charles C. Edwards to suggest in his recent speech before the Association of American Medical Colleges, "...I think that clearly we have moved beyond the point at which concerns about a physician shortage were genuine, if somewhat exaggerated. ...[Indeed] we may well be facing a doctor surplus in this country."[13]

Secretary Edwards' interpretation of the prospective health manpower situation should not be too lightly dismissed. After all, the physician/population ratios projected in Figure 5 are high not only by historical standards for the United States, but also by international standards as may be inferred from Table 5. In view of these projections, the formulators of the nation's health manpower policy should clearly ask themselves at this time, how much is enough? Indeed, now may even be the time to ask, is there already too much? And, if so, what are the economic consequences of a physician surplus?

One suspects that many members of this audience have asked themselves these questions as well, and that a good number are inclined to concur with Secretary Edwards' assessment of the health manpower situation. On the other hand, wide currency is still given to the notion that the nation continues to suffer from a serious physician shortage, not only in the press, but by respected students of the health-care sector as well. These observers point out that all of the symptoms of a doctor shortage are still very much in evidence in this country: physician fees are still rising, appointment calendars and waiting rooms are still crowded, some areas are still without physician manpower altogether, and the influx of foreign-trained physicians continues unabated. It is argued by these observers that only a massive further increase in American-trained physicians can ultimately eliminate these symptoms, and that such an increase presupposes a sustained program of medical school expansion. As Professor Alex Gerber has only recently put it in a paper entitled "Yes! There is a Doctor

TABLE 5

International Comparison of Reported Physician/ Population Ratios, 1969

(Number of Physicians per 100,000 Population)

NORTH AMERICA	
Canada	141
United States[a]	155
WESTERN EUROPE	
Austria	182*
Belgium	155
Denmark	145
Finland	95
France	130
Fed. Rep. of Germany	170*
Netherlands	122
Norway	141
Sweden	130
Switzerland	138
United Kingdom:	
England & Wales	121
Northern Ireland	131
Scotland	133
EASTERN EUROPE	
Bulgaria	183*
Czechoslovakia	145
Hungary	191*
Poland	146
Romania	129
Yugoslavia	95
OTHER	
Australia	118
Israel	245*
Japan	111
New Zealand	115
U.S.S.R.	231*

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[a] This ratio includes only professionally active physicians. It is not clear whether figures for the other nations have been similarly adjusted.

[b] Includes physicians who are registered in Israel but do not reside or practice there.

*Denotes nations reporting a higher physician/population ratio than was reported by the United States.

SOURCE: World Health Organization (1972), Table 2.1.

Shortage," (PRISM, August 1973):

> ...the preponderance of evidence suggests to me that this country suffers from both a maldistribution and a [n aggregate] shortage of physicians... I believe that in the long run this shortage can only be remedied by a federal commitment to fund a huge medical school expansion program...Such a policy calls for a doubling of our present medical school facilities. (Pp. 13 and 60)

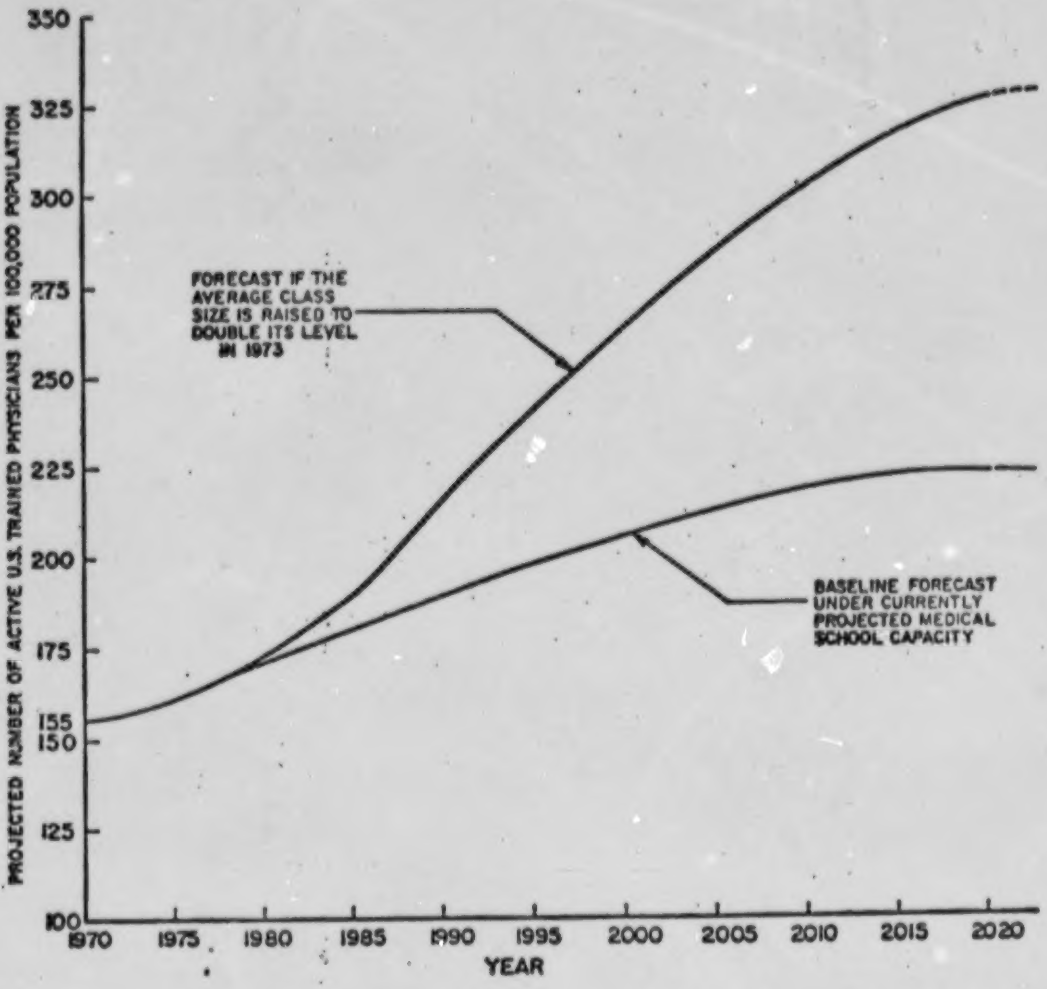
Figure 7 illustrates the projected long-run impact of Gerber's proposal on the future supply of U.S.-trained physicians (excluding, once again, all FMGs entering the United States after 1970). This projection suggests that Gerber is contemplating a truly staggering increase in the nation's physician/population ratio, or that in seeking to eliminate a short-run physician shortage through an expansion of medical school capacity he completely overlooks the supply impact his remedy has in the longer run. The inherent tendency of this approach to overshoot short-run supply targets should be obvious

Arguments to encourage, through continued Federal assistance, a sustained expansion of American medical schools tend to spring from good intentions and are apt to strike a responsive chord among concerned citizens and policy-makers. The notion that an increase in the physician supply such as that projected, say, in Figure 7, will make more physician services available to society and that this is all to the good has a certain intuitive appeal (even if some of these services may not be necessary on strictly medical criteria). In proffering this argument, however, it is sometimes overlooked that by committing itself to a sizeable increase in the number of physicians the nation also commits itself to maintain each of these physicians in a secure economic position, and "secure economic" position in this context has traditionally meant a position in the top five percent of the nation's income distribution. The alleged benefits from a vastly increased physician supply come at a stiff price.

Those who would seek to contain the rising cost of physician services and to solve the problem of maldistribution through massive increases in the aggregate supply of physicians seem to structure their case on a rather idealistic picture of the medical care marketplace, a picture with which true-blooded economists should feel comfortable, but one with which, after some empirical research, they have become disenchanted. Crucial to the "expansionists'" argument is the theory that increases in the aggregate physician/population ratio will engender fierce competition among medical practitioners, which in turn will generate all the traditional side effects, in text-book fashion. Thus it is thought that through price competition the level of physician fees (and hence the cost of health maintenance) will be forced down and that competitive pressure will force reluctant practitioners into the nation's cultural hinterland and/or into medical specialties endowed with relatively moderate degrees of social prestige. The widely held theory that for many years in the past the American Medical Association has maintained the physician's favorable income position through artificial constraints on the capacity of medical schools lends credence to this hypothesis. It is a theory in need of a review.

FIGURE 7

Long-Run Impact of Medical School Expansion on the Supply of Active U.S. Trained Physicians United States 1970-2020



SOURCE: Reinhardt (1974b), Chapter 2

If the market for physician services conformed to the textbook model of perfect competition, the previous scenario would be believable. Among the essential characteristics of a competitive market are, first, that individual sellers or buyers have no discretionary power over the price of the commodity being traded and, second, that changes in supply do not influence the quantity consumers demand at any given market price, that is, that demand and supply are independently determined. Many markets for commodities or labor services satisfy these conditions. They are true even for a number of professional services, such as aerospace engineering or pedagogy. One's prior knowledge about medical practice in this country, however, suggests that the market for physician services differs fundamentally from the competitive norm, as do the economic consequences of excess supply. The first distinct feature of that market is that demand is not independent of supply; within wide limits, physicians enjoy considerable discretion over the volume and mix of services they deliver to patients per episode of illness. The second feature of the market for physician services is that physicians tend to have wide discretion in the pricing of their services; there is evidence that within fairly wide limits physicians can set their fees so as to attain a chosen target income.[14]

Given these market characteristics, an excess supply of physicians is likely to generate upward rather than downward pressure on the cost of medical services and on the cost of health maintenance. Since fees can be raised to generate a target income, physicians can protect themselves from any serious loss of income even in the case of overt or disguised underemployment.[15] Under conditions of underemployment, however, one would clearly not expect physicians to show much concern over their own productivity. And, finally, since satisfactory incomes can probably be earned even under conditions of underemployment, one suspects that the culturally attractive locations (or attractive medical specialties) will always have disproportionately large numbers of physicians, and that medical manpower may not spill over into the new underserved areas unless the aggregate supply of physicians is truly staggering. For these reasons, a policy aimed at solving the problems of a geographic maldistribution of medical manpower (or the problem of maldistribution across specialties) simply through increases in the aggregate supply of medical manpower may either not succeed at all or, if it does succeed, may entail intolerable social costs. The problem of maldistribution must be attacked through other policy measures, either direct regulation or the development of financial incentives likely to produce the desired redistribution of health manpower. (Although the author is sorely tempted to offer some views on potential policy measures in this area, such a discussion clearly lies beyond the scope of this paper.)[16]

Critics of the preceding arguments frequently raise the rhetorical questions: "Precisely what is meant by an excess overall supply of physicians? And given the lack of precision in the application of medical science to human illness, what in fact is an 'unnecessary' physician service?" These are fair questions. Apparently unbeknownst to their authors, however, they do cut both ways. The fact is that in an area as complex as the delivery of medical care, it is well nigh impossible to offer an objective, universally agreed upon standard of the "right" number of physicians for a given population. There are simply no easily ascertained, objective market criteria on which to hang such a standard.

In markets for most ordinary commodities, the appropriate number of suppliers is one just capable of meeting society's aggregate demand for these commodities at their prevailing, market-determined prices. American society is accustomed to viewing this objective criterion as a reasonable definition of "need." The propriety of applying this criterion to physician services is, however, widely questioned, for reasons already indicated earlier. Under these circumstances, determination of the "right" amount of consumption per capita and the "right" number of suppliers for a given population ultimately becomes a political judgment, especially where much or all of that consumption is financed through the public sector. In the case of physician care, for example, the "right" number of physicians per capita will turn out to be the number that can be adequately supported out of the budget allocation that consumers collectively see fit to set aside for the physicians' sustenance. The number varies directly with the size of that allocation and inversely with the average income per physician the non-physician sector is asked to transfer to physicians as a group. If that income were, say, $45,000 after professional expenses, then the ratio of roughly 300 physicians per 100,000 population proposed by Gerber would require an annual budget allocation of roughly $500 per family of four just to maintain physicians at their customary station in life. The true budget cost would, of course, be higher still, for in addition to the physician's desired net income, his professional expenses (office space, equipment, and automobile) must ultimately be borne by consumers as well.*

One way to test whether 300 physicians per 100,000 population are too many or too few might be to ascertain consumers' attitudes towards this transfer of purchasing power. If that sum is lower than a generally acceptable maximum, then a case for expanding the physician supply is indicated. Given the potentially large "good Samaritan" component of physician care, it can always be assumed that work will expand to accommodate the expanded supply of manpower. The current clamor over the high cost of physician care, however, suggests that a figure much lower than that mentioned above is deemed excessive. This circumstance has clear implications for the number of physicians Americans truly wish to support--support, that is, at the incomes physicians customarily demand for their services and seem to be able to extract from society even under conditions of excess supply. The formulators of the nation's health manpower policy should not fail to take note of these implications.

IV. Concluding Remarks

During the past two decades or so, Americans have increasingly come to look to the public sector--and in particular to the Federal government--for assurance that health services will be available to all citizens in the right amount and at the right place. It is assumed that, since all health services are produced by some type of health manpower, the present and future need for health services can easily be translated into the corresponding "right" number of health personnel appropriately distributed over types of health manpower and over space. Given such projections the mandate to policy-makers is to make certain that projected health manpower requirements will be met by future supplies. Operationally, this mandate is translated into the goal of "not getting caught with one's pants down," so to speak--in a situation defined as one in which some or many commentators can argue persuasively that this or that type of health manpower is in short supply. The objective of this paper has been to examine this approach to health manpower policy.

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*It is recognized that not all of a physician's professional expenses would be eliminated were he to withdraw from medical practice. Some of his aides, for example, might have to be transferred to lend greater support to the remaining pool of medical manpower. Also, a portion of the transfer to physicians is returned to the general fund through taxes.

As was noted in Section II, the successful pursuit of the policy-maker's mandate in this case hinges, in the first instance, on the availability of reliable health manpower forecasts--hence the recurring requests by Congress and by public officials for such forecasts. These forecasts, it must be noted, are expected to be *predictions* of the future health manpower situation and not merely alternative scenarios corresponding to different sets of assumptions. The forecaster is expected to predict reasonably accurately the magnitude of health manpower surpluses or deficits ten or twenty years hence in the absence of public intervention now, so that the policy-maker can take immediate steps to eliminate whatever imbalances would otherwise occur.

A survey of health manpower forecasting in the recent past suggests that current forecasting techniques are simply not up to this exacting task.[17] Much basic empirical research has yet to be performed before forecasters will be able to furnish policy-makers with the precise point estimates sought by the latter. In the meantime, health manpower forecasters have made and continue to make do with more rudimentary models, many of which look to the manpower--population ratios of the most richly endowed regions in the United States as standards to be attained by the nation as a whole and rely on simple supply projections. As was argued in Section III, however, that procedure virtually guarantees one continuous escalation in estimated future health manpower requirements and continuous discoveries of current "shortages." If policy-makers are at all averse to risk--as they seem to be in this case[18]--and respond conscientiously to whatever manpower requirements are projected by this methodology, they may unwittingly act as major contributors to the rising cost of health maintenance in this country.

In Section III, the preceding proposition was illustrated with reference to the market for medical manpower. Implicit in that discussion was the suggestion that at the aggregate level, the nation may well be facing a physician surplus in the near future, especially if one includes in one's calculus the productivity gains that seem to be potentially attainable. Such a development, it was suggested, is not something to be made light of. First, one should not expect a physician surplus to eliminate the currently perceived maldistribution of medical manpower across geographic areas or across medical specialties. The market for physician services seems to be of a kind that tolerates excess supply and underemployment in one locality (or one specialty), side by side with acute shortages elsewhere. This very feature of the health-care market, however, also suggests that a situation that would objectively be described as one of excess supply is apt to remain camouflaged through overt or disguised underemployment and inefficiency in the use of physician time. The cost of either will, of course, be borne by consumers and/or taxpayers at least as long as physicians retain more or less complete discretion over their professional fees. (The aggregate supply of medical manpower and the proper scale of medical school capacity are therefore one of the more important issues to be addressed in connection with the impending health manpower legislation.)

Even if more sophisticated econometric models will one day enable health manpower forecasters to produce the predictions now routinely sought by policy-makers, the question can be asked whether such "point estimates" of future manpower deficits or surpluses are in fact the appropriate input into the formulation of health manpower policy. As was suggested with the aid of Figure 3, there are likely to be a great variety of alternative health-manpower configurations capable of meeting a given future demand for health services. Table 2 was a modest illustration of such a menu, albeit one involving only two types of health manpower and one type of provider facility. In principle, at least, it should be possible to extend this table to the entire health-care sector, and to rank alternative manpower combinations according to some preference scheme. Where the bulk of health care consumption is financed through the public sector, the most sensible ranking criterion would seem to be the relative cost of alternative manpower mixes.

Probably the most valuable contribution the health manpower forecaster could make to the process of policy formulation in this area would be to furnish policy-makers not with a single point estimate of the prospective manpower situation, but instead with the entire technically feasible health-manpower trade-off frontier faced by the health care sector now in the future (of which, as noted, Table 2 is a simple illustration), a forecast that should come replete with the "price tags" associated with particular manpower combinations on this trade-off frontier. By the same token, it can be argued that the proper task of public health manpower policy is not really to protect the health sector from being caught short of this or that type of manpower, but instead the steady and forceful steering of that sector towards the least-cost health manpower configuration capable of meeting the future demand for health care if, as seems to be the case, that sector cannot be expected to attain efficiency in health manpower utilization without public encouragement.

This prescription of health manpower forecasting and policy will be recognized as the second of the extreme policy approaches mentioned in the introduction. The approach is clearly more taxing on both the forecaster and the policy-maker. To furnish the requisite manpower projections, one must have reliable information on all of the technically feasible trade-offs enumerated in Figure 3. Such information does not seem to be available at this time, but an attempt could be made to develop it, were there a demand for such projections. Policy-makers, on the other hand, would no longer face the easy task of dealing with a single demand estimate and of appropriating sufficient funds for the production of the "required number" of particular types of health manpower. Instead, they would be confronting a complex menu replete with data on the cost implications of alternative manpower policies. One suspects that such a menu would inevitably force policy-makers to consider more boldly than has been customary in recent years policies designed not merely to feed an ample number of health personnel into the health-care sector, but also to "encourage" that sector to exercise economy in the use of that manpower. Such "encouragements" may take the form of direct regulation or, preferably, the application of strong economic pressure on the providers of health services and the provision of financial incentives likely to goad these providers into the desired direction. As the current situation in general surgery suggests, such pressures simply cannot be said to exist now in the market for medical services.[19]

It may be argued that the preceding paragraph belabors the obvious, that these desiderata are well known, and that during the past decade, at least, Federal health manpower policy has in fact followed precisely the pattern proposed above. After all, it may be argued, recent legislation in this area has stressed the need for training physician-extenders, and that concern itself betokens a shift in emphasis away from the traditional concern with mere numbers of health personnel and towards concern over the efficiency with which health manpower is used. This author begs to differ.

First, while legislation encouraging the development of physician-extenders certainly seems a step in the direction of greater efficiency in health care, public policy in this case still seems predicated on the notion that if only the Federal government facilitates the production of such personnel with generous public subsidies, the private sector will eagerly use that personnel in the manner originally intended, that is, as physician substitutes. One peculiar circumstance surrounding this policy is that the impetus for it seems to have come not from practicing physicians (the potential employers of physician-extenders) but primarily from educators and health policy planners.[20] A further peculiarity is that the production of this new type of health personnel seems so heavily dependent on public financing. If there were indeed a brisk demand for physician support personnel among medical practitioners, they would presumably be willing to pay such personnel a salary sufficiently high to amortize more or less the full cost of their training. By all appearances, then, the demand for physician-extenders actually seems rather sluggish. This demand for physician-extenders, rather than their supply, should be the prime focus of Federal health manpower policy.

Second, it simply cannot be denied that public discussions of health manpower policy are still given largely to the familiar numbers game. There remains the feeling, certainly in Congress, that a prospective health manpower situation ten or twenty years hence can be adequately projected by a single set of numbers, one number for each type of manpower, if only the Department of Health, Education, and Welfare tried. Alternative manpower forecasts for the same target years still evoke searching questions on which of the forecasts is "right" and which are "wrong," so that Congress may know to which of them it should react. Indeed, should alternative forecasts ever come out of the same agency--for example, should one office in HEW make mention of an impending surplus and another office point to an existing shortage--the stage is set for internecine warfare,[21] reported by the press with much bewilderment (if only affected bewilderment), and followed by the bureaucracy with some anxiety. The fact that such projections may simply reflect different assumptions about physician productivity or different time horizons--that is, that both statements may in some sense be "right"--tends to escape recognition.

Finally, the entire debate over health manpower policy, both during Congressional hearings and in the press, betrays a lack of appreciation for the flexibility one actually has in organizing most production processes, including the health care production process.[22] This flexibility blunts considerably the consequences of tautness in the supply of particular types of health manpower. That this seems to be true even of medical manpower is suggested by the fact that many nations are capable of maintaining the health of their citizens with far fewer physicians per capita than in the United States.

In view of the three points raised above, this observer is persuaded that health policy-makers in this country are not yet prepared to accept the more flexible forecasting approach advocated above, or to pursue the kind of health manpower policies of which that approach is a natural ingredient. It is equally true, of course, that health manpower forecasters would currently not be able to produce the projections suggested here. It strikes one as an area of high research priority.

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FOOTNOTES

1. The research project in question is the RAND-OEO experiment on alternative health insurance schemes.

2. American Medical Association (1971), Table 1, p. 4.

3. Reinhardt (1974b), Tables 7-1.

4. Reinhardt (1972).

5. In these calculations, it is assumed that every office-based physician employs the indicated number of aides.

6. U.S. Bureau of the Census (1972), Table 1, p. 12.

7. This diagram is taken from Reinhardt and Smith (1972).

10. A part of the historical pattern can, no doubt, be explained by the introduction in the late 1960s of the Medicare and Medicaid programs, a development that could not have been foreseen in the political climate of the late 1950s when the Bane Committee issued its report.

11. Since 1970, the average annual immigration of FMGs has exceeded 3,000.

12. Reinhardt (1974b), Tables 7-1 and 7-2.

13. See Edwards (1973), p. 6.

14. Feldstein (1970).

15. This assertion finds support in the fact that general surgeons seem to be able to earn a reasonably high income even in areas where they are known to be underemployed.

16. See, for example, Reinhardt (1974a) and (1974b), ch. I.

17. For excellent earlier reviews of health manpower forecasting models, see Butter (1967) and Hansen (1970).

18. An exchange between Dr. Kenneth M. Endicott (formerly director of the Bureau of Health Manpower Education of the Department of Health, Education, and Welfare) and Congressman Rogers (Chairman of the House Subcommittee on Health and Environment) serves to illustrate this assertion. In his testimony, Dr. Endicott had alluded to the danger of eventually overshooting the true requirement for medical manpower. He was firmly reprimanded for the mere suggestion of that possibility. See U.S. Congress (1971), pp. 296-7.

19. A careful examination of such policies here would lead too far afield. The author has explored them at greater length elsewhere. See Reinhardt (1974a) and (1974b), chs. I and VII and VIII.

20. See Todd (1971), p. 61.

21. See, for example, The New York Times (January 13, 1974), p. 58.

22. In his earlier review of health manpower forecasting, Hansen also deplored the policy-makers' tendency to think in terms of so-called "fixed input-coefficient" production models. See Hansen (1970), p. 105.

THE DISTRIBUTION OF PHYSICIANS GEOGRAPHICALLY AND BY SPECIALTY

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I appreciate this opportunity to think with you about health manpower generally and particularly my assigned topic--the nature of the problems of physician specialty and geographic distribution and approaches to coping with these problems. I chose "coping" rather than "solving" because the problems are enduring--the distribution problems will always be with us--I would even go as far as to say they are permanent conditions. Our task is to manage them effectively and to keep their consequences within reasonable bounds.

There is a reasonable consensus on the broad outline of our physician distribution problems. There are too few physicians delivering primary care. Geographically, many Americans have inadequate access to the health system generally and particularly to primary care physicians. And in most of America there is uneven access to medical, surgical, and other physician specialties. There may be too many surgical specialists, and too few of some other specialists, such as therapeutic radiologists.

However, when one attempts more precisely to define the nature and magnitude of these problems there is less consensus. In the specialty area we truly start at square one, namely, defining exactly what is meant by specialty service and physician specialist.

You are all familiar with the limitations of the available data base which classifies a physician as a specialist in the category the physician self-reports spending most of his time. Most physicians are delivering services other than those in their so-called primary specialty. And, of course, the physician is classified as a specialist whether or not he is board certified. Clearly, a large number of specialists other than general and family practice specialists are providing a substantial amount of primary care. At the same time, the general practitioner provides services considered the specialty of another group, for example, when providing obstetric care.

Table 1 shows what the 1972 M.D. specialty profile looks like when the specialties of internal medicine, pediatrics, and obstetrics and gynecology are grouped with general and family practice under the rubric of primary care. The grouping is not totally arbitrary. In some preliminary analysis we have done using the National Disease and Therapeutic Index, 80 percent of the most frequent disease conditions treated by internists and pediatricians were found to be the same as those treated by general practitioners. Referred patients constituted only 8 percent of pediatric prac-

TABLE 1

1972 Physician Specialty Profile

		Number	Percentage
All M.D.s		320,903 1/	100
Primary Care		144,046	45
General and Family Practice	55,343		17.2
Internal Medicine	47,994		15.0
Pediatrics	20,507		6.4
Obstetrics and Gynecology	20,202		6.3
Surgical Care		70,207	22
General Surgery	30,989		9.7
Other Surgery	39,218		12.2
Other Specialties		72,098	22
Miscellaneous		34,547	11

1/ Includes 12,356 active M.D.s "not classified" by AMA.

Source: Roback, G.A., Distribution of Physicians in U.S., 1972. AMA, Chicago, 1973.

tice, 26 percent of internal medicine practice, and 19 percent of obstetric/gynecology practice.

We also recently had a survey conducted of manpower utilization in prepaid group practice plans providing comprehensive health care to defined populations. Utilization statistics collected on those plans indicated that between 52 percent and 85 percent of physician encounters were for adult medicine, pediatrics and obstetric/gynecological care. I would suggest, therefore, that this profile shows a fair "ball-park" estimate of our current primary care capacity. Physicians in the three specialties that I grouped with general and family practice are providing specialized services in their specialty, and, to that extent, the primary care capacity may be overstated. On the other hand, the surgical and other specialists may be providing an off-setting amount of primary care services.

I should note that Table 1 does not include osteopathic physicians. Some 60 percent of osteopathic physicians indicate they are engaged in primary care. However, since they represent only 5 percent of the total physician pool, the total statistics in primary care would be much the same as indicated in this chart.

If we accept this profile as a useful picture of our existing physician service delivery capacity, what is the picture likely to be in the future using the same groupings? Table 2 compares the specialty profile (on Table 1) with the specialty profile of first-year residents.

TABLE 2

Total U.S. and First-Year Resident Specialty Profiles
Percentage Distribution, 1972

Specialty Group	Active M.D.s		First Year Residents	
	(320,903)		(16,773)	
Primary Care		45		39
General and Family Practice	17.2		1.0	
Internal Medicine	15.0		21.2	
Pediatrics	6.4		9.5	
Obstetrics and Gynecology	6.3		6.1	
Surgical Care		22		28
General Surgery	9.7		15.9	
Other Surgery	12.2		11.8	
Other Specialties		22		29
Miscellaneous		11		4

Sources: Profiles of Medical Practice, AMA, Chicago, 1973.
Directory of Approved Internships and Residencies, 1972-73, AMA.

Using the first-year resident profile as a basis for classifying annual additions to the manpower pool, the resulting projections of physician supply for 1980, '85, and '90 result in profiles not much different than that shown in Table 2. The primary care grouping will, at the very best, just keep pace with the overall growth of the M.D. population; the grouping is more likely to drop a few percentage points as a proportion of all M.D.s. If, instead of first-year residents we use either all residents or trends in residents over the past few years, the picture for the future does not change significantly. For example, even if the dramatic growth in family practice residents of the past few years--from 265 in 1970, 632 in 1971 and 1,041 in 1972--is projected as a trend into the future, the numbers are too small to make a significant difference by 1990.

Unfortunately, the future supply of osteopathic physicians will not be much help; despite the large number of osteopathic physicians currently in general practice, osteopathic residents are following the trend of M.D. residents and opting for specialty training other than family practice. Neither does the size of FMG influx make much difference in the picture of the future; FMG residents choose among the specialty groupings much as USMGs do.

There is a general consensus that our primary care capacity is inadequate. The question is, how inadequate? Unfortunately, there are neither hard data nor a professional consensus on an optimal distribution of physicians by specialty. We are not totally without some clues, however.

In the study of prepaid group practices mentioned earlier, specialty distribution in four group plans was determined as indicated on this next transparency.

TABLE 3

Total U.S. and HMO Physician Specialty Profiles
Percentage Distribution, 1972

	Total U.S.	HMO Full-Time Equivalents			
		I	II	III	IV
Primary Care	45	66	69	69	57
Surgical Care	20	18	15	13	22
Other Specialties	21	14	15	14	18
All Others	14	2	1	4	3

HMO Groups:
I - Hospital-based plans over 30,000 (n=2)
II - Non-Hospital-based plans over 30,000 (n=7)
III - Hospital and Non-Hospital-based plans under 30,000 (n=8)
IV - Service Foundation plans (n=2)

Sources: Profiles of Medical Practice, AMA, Chicago, 1973
Contract NIH 72-9843, Manpower Survey of Prepaid Medical Care Plans, Gorby and Associates.

The groups surveyed (as shown on Table 3) were classified into four categories as indicated. As anticipated, groups II, III, and IV made extensive use of part-time physicians on a fee-for-service basis. In order to achieve comparability, therefore, it was necessary to translate these part-time providers into full-time equivalents. As can be seen, these results suggest that the national primary care physician manpower pool, as a percentage of all physicians, is well below the proportion for pre-paid groups. Using those groups as a standard, the national capacity seems to be at least 20 percent short.

Table 4 shows how United States specialty distribution compares with that of Canada.

TABLE 4

U.S. and Canadian Physician Specialty Profiles
Private (Office Based) Practice
Percentage Distribution, 1972

Specialty Group	U.S. (201,302)	Canada (26,920)
Primary Care	50	65
Surgical Care	24	17
Other Specialties	19	17
Others Not Grouped Above	7	1

Sources: Profiles of Medical Practice, AMA, Chicago 1973.
Canada Health Manpower Inventory, Ministry of National Health and Welfare, 1973.

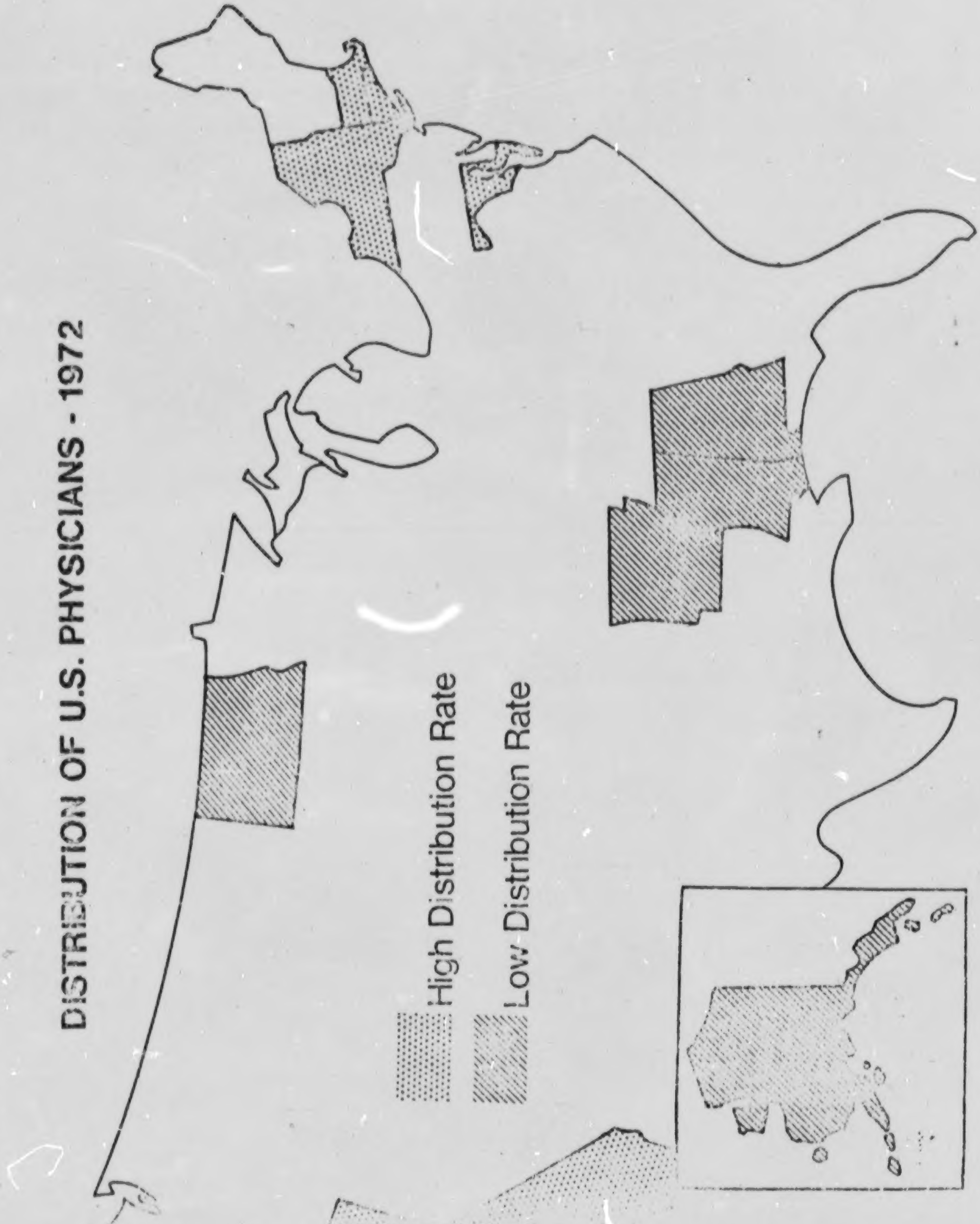
The profile shows only office-based practice, because the Canadian data base handles hospital staff a little differently. As can be seen, the U.S. primary care physician manpower pool, as a proportion of all physicians, is some 15 percent below that of Canada. There are, of course, important differences between the Canadian and U.S. health care systems that should be kept in mind. Canada has problems of distribution. I look forward with interest, therefore, to Dr. Evans' presentation tomorrow to learn about approaches Canada is taking to cope with these problems.

Both of the yardsticks used in these comparisons are less than ideal for our purposes, and I would not want to suggest that the percentage shortfalls of U.S. primary care physician manpower that were illustrated should be used as precise measures for goal setting purposes. They are useful estimates of an order of magnitude.

The major point I've tried to make is simply that our shortfall in primary care physicians is very, very severe--and will not get any better in the future if we keep on doing business as usual--just tinkering with the system here and there will not help. Major and fundamental changes in the system itself are absolutely essential, and it is the graduate education medical system which must be the major focus of change as well as the lead change agent.

You've noticed, no doubt, that I've avoided commenting on the adequacy of the size of the other specialty groupings--let me assure you that the avoidance is deliberate, not accidental. On other specialty distribution issues, I think it best to await the results of activity studies such as the one being conducted jointly by the American College of Surgeons and the American Surgical Association on surgical services in

FIGURE 1



DISTRIBUTION OF U.S. PHYSICIANS - 1972

High Distribution Rate
Low Distribution Rate

the United States.

Actually, I think if we tackle the primary care physician problems in a meaningful way, it may be the best single thing we can do to sort out questions about the kinds and numbers of other specialties. Beyond that--I urge there be more and better--in terms of relating quality and quantity of services to health outcomes--studies of the SOSSUS type.

Turning now to the matter of geographical distribution, conclusions similar to those about specialty distribution seem inescapable. The average number of physicians per capita in the five highest states shown in Figure 1 is 235 percent of the average number per capita in the five low states. The geographical distribution of physicians generally is highly correlated with population density and per capita income. Although the latter may be largely offset by national health insurance coverage, the former is likely to be an enduring factor of life that we will have to accept. Physicians are not likely to settle in isolated, sparsely populated areas in any significant numbers for the same reasons that other people don't settle there. Again, just tinkering with the health care delivery system will not do. Major changes are required for rural care delivery, and changes just as drastic, although perhaps of a different kind are required for inner-city underserved areas.

The implicit theme of my remarks is a proposition, namely, that the major strategy available to us--the strategy least likely to cause us difficulty in the future--is to attack the problems of physician specialty and geographic distribution by targeting our efforts on the goal of significantly increasing the delivery of primary care services.

There are any number of ways to go in trying to achieve that goal; from the manpower viewpoint, these may be grouped into several major approaches as shown in Figure 2.

FIGURE 2

Major Approaches for Modulating
Geographic and Specialty Distribution Problems

--Change composition of entering students.
--Change undergraduate educational experience.
--Increase incentives for primary care practice in underserved areas.
--To change allocation of health care responsibility:
    among physician specialists
    to non-physician health personnel.
--Modifying the graduate medical education system.
--All of the above.

The first approach is based on a number of studies that have shown that: students from rural areas tend to practice in rural areas; women physicians, as a group, choose the primary care specialties more often than men. The proposition also has been offered that an increase in minority group representation in the health professions education system will result in more of those students choosing to serve in currently underserved areas.

Our efforts to change the composition of entering medical students certainly should continue, but, I suspect, unless there are some major system changes, we should not be too surprised that students selected for these characteristics (rural or small town, women, and minority groups) will begin to opt for specialties in essentially the same pattern as student bodies of the last several years.

Another approach is to modify the undergraduate educational experience of students--primarily in the third and four clinical years--to provide more exposure and training in general medical practice, particularly the ambulatory care mode. This is difficult to do under present circumstances because graduate medical education, heavily hospital based, provides much of the faculty effort to the third and fourth undergraduate clinical years. Thus, an adequate primary care training environment is hard to come by without major changes in graduate medical education.

For some time now, loan forgiveness has been an available mechanism to increase the incentives for physicians to opt for practice in primary care in currently underserved areas. This approach has not been notably successful to date, but the loan limit may have been set too low.

The potential for other kinds of incentives has not been fully tapped. For example, a more dramatic mechanism such as a higher fee schedule in rural and intracity areas might be tried. I understand that such a differential fee system has been used with some success in Canada. Presently the price settings structure provides a disincentive--"usual and customary" fees in underserved areas are generally lower.

And if we are really serious, consideration might be given to exempting physicians from state and Federal income taxes for a given period after licensure if they practice in underserved areas, enabling them to make needed capital investment in partnership and group practice facilities and arrangements.

Finally, the suggestions--seriously, not capriciously, made by some thoughtful persons--that *all* graduates of our medical schools be required to serve two years in national service at an appropriate point after graduation is the most dramatic variation of this type of approach.

These three major approaches represent what might be called within-system changes. But, as I have implied several times, these approaches alone are not likely to make a significant dent in alleviating our physician distribution problems unless there are some basic changes in the system itself. Which brings us to the fourth and fifth approaches.

It is very unlikely that we will be able to effect significant changes in the distribution of physicians who are in established practices today, either by specialty or geographically. Thus looking ahead to 1985, if changes are to be made in the number of primary care physicians on the order of magnitude indicated earlier, then our target must necessarily be the 65,000 students who will receive their undergraduate M.D. degrees in the years 1975 to 1980. Modifying the graduate medical education system, therefore, would seem to be the key major approach in achieving the goal of increased primary care services.

What kinds of changes? A reallocation of service responsibilities among specialties seems compelling. The grouping of specialties I've used suggests that a new specialty breed, which would represent some combination of the current general and family practice, internal medicine, pediatric and obstetrical/gynecology specialties may be an idea whose time has come. Such a core specialty, perhaps with the four current specialties viewed as sub-specialties or super-specialties could be intellectually demanding and satisfying, and humanly as well as economically--rewarding--so that it could compete successfully with other specialties as a first class--not second class--option for medical students.

While working on a reallocation of responsibilities among physician types, we need to very systematically develop a reallocation of responsibilities--and not just in the primary care specialties--to other health care personnel. It is difficult to imagine adequate health care delivery in remote, rural areas without the use of such personnel and modern communications technology. But we'll hear more on this from Charles Lewis in the next presentation. The important point here is that graduate medical education in primary care will need to include an opportunity for team training.

Clearly, increased opportunity for learning experiences in ambulatory care represents another needed change. I would suggest, however, that it is important not to equate ambulatory care with primary care and further, that new ambulatory care experiences should heavily involve the clinical faculty of all four of the specialties under the primary care grouping.

Careful consideration will have to be given to the geographical location of ambulatory care training programs and facilities, both hospital-based and free-standing. They will represent a linkage to our university medical centers; most of our studies of the choice of practice location by physicians show that the availability of such a linkage is a critical factor. This suggests that a Health Extension Service patterned somewhat after the Agricultural Extension Service--but applicable to all areas--may be a concept worth serious exploration.

With changes in graduate medical education the key, there are many other doors that will have to be unlocked, and opened, in the health care delivery system if we are to achieve our goal of major increases in primary care services. But time does not allow me to address them here. Generally, they are the sort of changes Monte DuVal was suggesting for consideration in his 10-point program.

Like all good multiple choice test questions, you'll note that Figure 2 shows a fifth choice, namely, "all of the above." Because I'm no great believer in silver bullets, I would suggest that "all of the above" is the appropriate answer. Getting from here to there will take coordinated action of all involved parties--the professions, the third party payers, the consumers, the educational institutions, and government at all levels.

Tomorrow, Dr. Henry Simmons will discuss some proposed U.S. actions addressed to these and other manpower problems. Whatever the specific actions taken, I think the lead role of Federal reimbursement mechanisms will soon become much more prominent with the likely passage of some form of national health insurance. Those mechanisms, in my judgment, are the major levers for effecting changes in both the graduate medical education system and the health care delivery system.

It is for this reason that I consider the new study by the Institute of Medicine on the effect of these mechanisms on graduate medical education to be absolutely crucial to sound and helpful change in the graduate medical education system. I was particularly pleased, therefore, to hear that Ruth Hanft who has just completed an outstanding job as Project Director for the study on Cost of Health Professions Education for the Institute will be Project Director on this new study and that the Institute is again assembling a first-class committee to guide the project.

I eagerly await the outcome.

THE USE OF NON-PHYSICIANS IN HEALTH CARE

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Once upon a time, in a valley not too far away, there lived a group of cyclops who earned their living tending flocks of goats and sheep. These creatures were, in general, wise and kind, but most were afflicted with a high degree of myopia. Periodically, the giant who owned the valley would bring them additions to their flocks, and then there were great discourses about appropriate cyclops--ruminant ratios.

One day a cyclops, exhausted from his attending, fell face down in the pasture. Now this area was littered with bits of broken glass, since it had been the site of a three-day rock concert in pre-historic times. As the herdsman looked up (almost all of the cyclops were males) a piece of glass with a minus 4.50 diopter curvature was lying just in front of his eye. To his great amazement, his vision was greatly improved, and he saw things he had never seen before. He picked up the fragment and continued to use it in his daily work.

Word of his experience spread, and many of his colleagues searched for and found similar pieces of glass. Some cyclops began polishing these pieces so that they had exactly the characteristics they wanted. Some found their new devices so effective that they left them alone to watch the flocks while they went to meetings or on vacations.

One day, several cyclops in different sections of the valley independently came to the same conclusion: "What you are using," they said, "are vision-extenders. If these things really improve the quality and quantity of herding, then we ought first to prove it and then set up places where they can be prepared in a more formal way, so that every cyclops does not have to make his own." And such efforts came to pass.

There subsequently arose a series of arguments throughout the valley. Some polishers used pink glass, and others used blue glass. Each of these groups believed that their product was superior to the other. Many of the cyclops refused to purchase glasses polished by someone else and continued to make their own. When the giant saw what was happening, he decided to replace some of the cyclops with the glasses themselves, because they were much cheaper.

This policy was disturbing to some. However, others had discovered that they could improve their myopia by looking through a small hole (by narrowing their field of vision they no longer needed help). There was also evidence that some of the vision-extenders that had been left alone in the far pastures had begun to herd the sheep and goats themselves and no longer needed a cyclops.

Conflict among these groups increased to the extent that it consumed most of the energies of the cyclops, the glasses, the polishers, and the giant. The arguments went on and on until it became apparent that none of those involved could any longer tell the sheep from the goats. In the meantime, the flocks wandered off over the hills into a new valley where they learned to look after themselves.

Now every fable should have a moral, but I shall defer providing one in this case until the end of the presentation.

As implied in the story, I believe that there have been three phases in the natural history of the development and utilization of intermediate health practitioners, a generic term I shall use to include the various sub-species of nurse practitioners and physician assistants that abound.

Phase I

The first phase--informal delegation by physicians to a variety of office employees--probably began the first time that a patient was unable to reach his or her physician. There is ample evidence that for decades some physicians have delegated a variety of functions, tasks, and services associated with the practice of medicine to all sorts of non-physician personnel.

More formal documentation of these practices was provided by a recently published "Survey of Innovative Changes in Health Services, 1971-1973."[1] In this study, conducted by us under a contract for the Bureau for Health Services Research, an attempt was made to locate physicians who were described either by their colleagues or themselves as being "innovative" in their use of personnel, record systems, and technology, or who recently had made changes in the organization of their practice or methods of payment for their services.

A total of 1,034 such physicians were identified throughout the United States and interviewed in depth about their practices. Thirty-four percent were in family practice, 12 percent in pediatrics, and 15 percent in the practice of internal medicine.

Of the 4,146 personnel employed by them, 103 were graduates of formal training programs for physician assistants or nurse practitioners. An even greater number of their employees were performing the same functions as these "certified" intermediate health practitioners.

Detailed information was obtained from each of these physicians about the tasks currently performed in their offices by each of their employees. Visual inspection of the data suggested that there were different patterns of delegation depending on the nature of the function or task.

One "family," or group, of tasks seemed to be delegated in an almost linear fashion, proportional to the amount of formal training of any type that the employee had received.

Examples of the first type of tasks include: taking a medical history, checking wounds for healing, removing sutures, answering questions on growth and development, and instructing patients on the treatment for certain common problems such as acute tonsilitis.

Those tasks and functions in the second group, delegated only to employees with training equivalent to or greater than that of a registered nurse, included instructing patients in the treatment of hypertensive cardiovascular disease, evaluating patients for the signs and symptoms of congestive failure, ausculation of the heart, the performance of routine prenatal examinations, the performance of pelvic examinations, and doing routine well child and well baby examinations.

The extent of delegation by each of these physicians was scored, using empirical but explicit criteria. Table 1 summarizes the results of these judgments.

TABLE 1

Delegation Score by Content of Practice (N=887)

Delegation Score	Family Practice (%)	Pediatrics (%)	Internal Medicine (%)	Total
Over-Delegator	15.2	3.1	4.8	10.3
Appropriate Delegator	21.3	24.5	23.8	22.5
New-Manpower Delegator	17.7	32.7	7.1	18.0
Non-Delegator	45.7	39.8	64.3	49.2

Over-delegators were defined as those who assigned two or more "complex" tasks to individuals with one year or less of formal training. Approximately 10 percent of the physicians in this survey were classified as "over-delegators." They were more often found to be providing primary care, and there was a direct relation between the volume of workload, or number of patients seen per day by practitioners, and their tendency to "over delegate."

Forty-four percent of the employees of physicians in the survey were classified as office or clerical personnel. The data indicated that almost every function or service being provided by the physician was also being performed by every type of employee. For example, more than 20 percent of individuals with less than one year of formal training were engaged in counselling patients and evaluating their symptoms. Twenty percent of clerical personnel took routine x-rays and 3 percent of office clerks made house calls without a physician in attendence.

As part of the survey, these "innovative physicians" were asked about their interest in hiring personnel prepared by formal training programs, either for physician assistants or nurse practitioners. Almost half of them (45 percent) indicated that they would prefer to be assisted by someone who was trained by them on the job.

There are no data on the patterns of delegation of patient care functions to office personnel in all ambulatory care settings in the United States. In all probability the group studied is not representative. However, it is unlikely that it represents a "lunatic fringe," since the most effective methods of identifying these innovators were through formal medical organizations, such as state and county medical societies, as well as their nomination by peers in the local medical community. While there are varying estimates of the numbers of graduates of existing physician assistant and nurse practitioner training programs now in practice, it seems probable that there are far more non-physicians providing primary care who have received only on-the-job training.

Phase II

The second stage in the intermediate health practitioner movement began in 1964-65 when several groups throughout the United States began studying and/or demonstrating the ability of non-physicians to provide care for patients.[2,3,4] In other settings, training programs for the preparation of nurse practitioners and physician assistants were initiated.[5,6]

It is of interest that the principal driving force for the early demonstration activities was not related to either cost control or the physican shortage. The individuals involved in these efforts were concerned about the *quality* of patient care being provided to certain groups of ambulatory patients, and the utilization of non-physicians represented a means to improve the quality of that care, rather than to demonstrate that nurses could replace doctors, etc.[7]

The second phase has been characterized by an epidemic of "discoveries" that nurses and others are able to acquire certain skills possessed by physicians, and that these skills and other content can be taught to non-physicians.

Before reviewing the data generated during this phase describing curricula and the impact of these graduates on the workings of health services, I should like to address the question of the role of intermediate health professionals as members of the health care team. It is important to recognize that discussions of health care teams pre-date, by a considerable period, the "formalization" of non-physician personnel as providers of care. Prior concerns about the team were related to the interrelationships of physicians, social workers, nurses, dieticians, and many other formally prepared and regulated occupational groups concerned with the provision of patient care services.

I believe that styles of care by teams have a fascinating parallel to the development of team-play in football. In this analogy the offensive team is composed of physicians and the members of other health professions. The defense represents a variety of biological and social variables in patient care.

The fundamental style of play prior to World War II I have called the "M.D. power sweep," which is much like the once prevalent double wing offense. The main objective in this play is to give the ball to the physician (tailback) and for everyone to either get out of his way or knock someone else down, if possible.

Following World War II, a new type of strategy developed, This paralleled the development of specialty medicine. In this play, the quarterback, or the physician of the first contact, receives the ball, or patient's problem, runs as far with it as he can, and then has the option to lateral off to any one of the trailing specialists (known as a referral). While this is a much more formidable offense, it is also more hazardous, since the number of fumbles are increased as the ball (problem) is thrown about among the various specialties.

In football, defenses change to meet offenses; in medicine, to cope with more difficult problems, a more complex form of team play has evolved that includes a variety of disciplines. This might be considered analogous to the contemporary split-T formation.

In this formation certain specialists are engaged in activities that might be described as parallel play. Unless the execution is precise, the result can be loss of yardage and down (time and money).

Over-stretching the analogy, I should like to suggest that in the majority of chronic illnesses, the most appropriate play is "The Patient-Family Draw." The physician, in this game, takes the problem, does with it as best he can, but gives it back to the patient, since it is the patient and his family who must cope with the problems associated with long term illness.

The attributes of a professional quarterback (physician) are listed in Table 2.

TABLE 2

The Pro-(MD) Quarterback

Reads defenses (makes a total evaluation).

Calls best play.

Knows abilities of other players; listens to them in huddle.

Gives ball to others as indicated.

Is goal (patient) oriented, rather than play oriented.

Given the demands upon such an individual, and the fact that current preparation for team play for all disciplines consists of their socialization-education in strict isolation from all other members of the team, it is not surprising that team care is more rhetoric than reality. The isolation of the preparation of intermediate health practitioners from those with or for whom they must work, does not further the cause of "team care." There is reason to believe that physician assistants and nurse practitioners will further the possibilities of inter-professional conflict, if only by increasing the numbers and types of players who seek to meet their own needs while meeting those of the patient.

Following the investment of several million dollars over the past six to eight years, there are fragments of data from a variety of studies of individual programs and their graduates to suggest that patient acceptance, once thought to be a major barrier to utilization of non-physician providers of care, may be the least of our problems.

A variety of programs have studied the impact of nurse practitioners[8,9,10] or physician assistants with different degrees of experimental rigor. In 1965 we randomly assigned patients to experimental and control groups in order to evaluate the impact of care provided by nurse practitioners.[11] Some of the results of this inquiry are summarized in Table 3.

TABLE 3

Outcomes of Care: Kansas

	Regular Clinics	Nurse Clinics
Deaths	3/118 pts	1/86
Disability	Decrease in Employment	Significant increase in employment both clinics ($p<0.05$)
Discomfort (frequency of complaints)	No Change	Significant reduction both clinics ($p<0.05$)
Dissatisfaction Rate of Broken Appointments		50% of rate for controls both clinics ($p<0.05$)
Critical of Care	More Critical $x^2=8.74$, ($p<0.01$)	
Rate of Using Other Resources for Care	Significantly Higher ($p<0.05$) than in nurse clinics	

There was no difference in the mortality and morbidity in the two populations. There was a significant reduction in the disability of those individuals receiving care from nurse practitioners compared to control groups receiving care from residents and their faculty advisors in the Department of Medicine Out-Patient Clinics. There was also evidence that the patients in the experimental group had a reduced frequency of complaining (less discomfort) and were much more satisfied with the care they received, as evidenced by less appointment-breaking, less out-of-program use of services, and direct expression of satisfaction with care.

Similar results have been obtained in other studies.[12,13] However, despite the investment of several million dollars in a variety of training programs for physician assistants and nurse practitioners, data on the evaluation of these programs is limited to a series of case studies.

There are no studies that compare graduates of one program with graduates of another program, even within categories, and certainly no information that would permit speculation on the comparative activities, performance, and impact of nurse practitioners versus physician assistants.

While there have been opportunities to seek such answers, the actions of federal agencies has been to render such studies difficult, if not impossible.

Table 4 summarizes the data on evaluation of these programs that exist in the literature.

TABLE 4

Characteristics of Non-Physicians
Providing Primary Care

	Nurse Practitioners	Physician Assistants
Acceptance by Patients	> 95%	> 95%
Quality of Processes	= or better than MD	= or better than MD
Quality of Outcomes	= or better*	--
Effect on Productivity	↑20%-40%**	↑20%-40%**
Sex	> 95% ♀	> 80% ♂

*Depends on processes and patient-provider interactions.
**Depends on scope of functions and "salary."

As indicated, acceptance is equal and of no problem; graduates of certain programs (of both types) perform the skills and cognitive functions desired as well as, or better than, physician reference groups; the outcomes of care are of comparable quality. The quality of outcomes is best compared across groups when one has some idea of the nature of processes that might have been utilized by different practitioners to achieve these outcomes. The differing skills and backgrounds possessed by nurse practitioners and physician assistants lead one to project that the two groups could have differential success in achieving outcomes for different problems.

Productivity has increased where this variable has been examined but this is dependent upon the scope of functions or tasks being provided by the intermediate health worker, and, of course, their remuneration.[14] Perhaps of more significance is the fact that these new identities are quite sex-linked. The fundamental sex-role stereotypes that have plagued medicine and nursing have been passed on to their offspring.

It is important to realize in examining the impact of these programs and their graduates, that they have been established and promoted for a variety of motives. To some, the preparation of these providers represents an outlet for their frustrations in trying to make changes in medical education. Others are primarily interested in generating new manpower, or womanpower, that will fill perceived needs for certain types of services in certain areas. Professional motives are manifest in some.

Regardless of the overt and covert objectives of a program, some experience has accumulated to suggest that there are certain general problems related to the future of non-physician providers of primary care that are quite separate from the issues of acceptance, quality of performance, and productivity: 1) there is evidence, at least from our own program at UCLA, that the quality of performance of a student after completion of the "formal" coursework is more dependent upon the characteristics of the setting in which she is providing care, and the physician who supervises that care, than either her qualifications at the time of admission to the program (including her prior level of nursing preparation), or the quality of her performance during the educational experience; 2) pressures to specialize are impinging upon generalists, such as the family nurse practitioner; 3) there is no evidence that the educational processes per se make intermediate health practitioners more anxious to serve in less desirable geographic areas, or to care for less "interesting" problems than those with considerably more elegant, i.e., lengthy, preparation; 4) there is evidence, at least from our survey of innovative changes, that occasionally the spouses of physician assistants and nurse practitioners influence the location of their practice.

The problems faced by intermediate health practitioners and the forces buffeting them following completion of their formal education are identical to those confronting physicians after graduation from medical school. Some of these are related to the process of education and the nature of the work setting; many of them can be attributed to the nature of the system in which they work.

Phase III

As the security of these programs has been established by their ability to produce a second generation of graduates (frequently using the first generation as the role models), some of the problems of a third phase are becoming evident. Superficially, this phase might be described as a territorial power struggle among professions and their organizations. Questions under debate are: Who is in charge here? Who has the right to do what to whom, or to teach what to whom?

Fascinating semantic games have developed to preserve professional integrity or avoid open conflict with state licensure laws. Physical examinations have become "physical assessments;" medical has been replaced by "health;" and roles are being expanded, or extended, or something; diagnoses have become "hypotheses."

Battle lines have formed between organizations such as the American Academy of Pediatrics and the American Nurses' Association over the degree of physician involvement in certification examinations.

A cursory review of the "letters to the editor" sections of recent newsletters, journals, etc., reveals the vitriolic nature of the exchanges between those physicians who view non-physicians (especially nurses) as incompetent subordinates (water boys for the "team") and those nurses who view the first independent nurse practitioner as the Carrie Nation of the movement. Many of those who are most active in these inter-organizational crusades have had no personal experience in providing patient care with those whom they are attacking (sic semper war!).

Nursing educators are anxious to prepare nurse practitioners at the masters degree level who would possess the competence of nurse clinical specialists in addition to some of the skills of the primary care physician. However, our experiences suggest that the majority of nurse practitioners working outside of academic centers are serving as primary care physicians. Most of their practices have little content that could be classified as nursing.

Some of the problems evident in Phase III are not related to the stresses and strains of organizations engaged in extramural and intramural efforts to deal with change. Some of these problems are related to properties of the system of which these organizations, programs and practice settings are a part. Phase II served to transform phenomena that might be considered to be a function of the personalities of individual practitioners into formal, institutionalized entities, independent of their creators. (The child has become an adolescent, seeking an identity of its own, and destined to become an adult.) Many of us saw in this movement the means to change a system and its institutions. The system is now in the process of capturing the change agents.

If nurse practitioners end up providing physician-substitution services rather than nursing care, it should not come as a surprise. The system values, in economic terms, medical, episodic disease treatment, not supportive, preventive, or comforting care. The system has never paid for clinical nurse specialist services, and there is little evidence that it is about to do so in the near future.

Perhaps it is time to realize that the reason some non-physicians are concerned about being paid a salary plus a percentage of the net income from a practice, or going into fee-for-service practice is not just to seek independence, but also to respond to the system.

I would like to conclude with some suggestions for policy makers that I think are implied by the foregoing remarks.

> --If intermediate health practitioners are to provide the kind of service, i.e., primary care, where it is most needed (underserved areas), then they must be considered as part of a system of care rather than the prodigies of a specific free-standing program.
>
> --If we want these individuals to care for people in certain geographic areas, we must select individuals who have demonstrated their interest in working in these areas at the time they are accepted in the programs. We must be careful not to replicate the process of selection for medical schools.
>
> --The education provided, in whatever format, must be education in the sense of the word,

rather than training. There must be someplace for these practitioners to go. Some of them will want to become physicians and should have that opportunity.

--We should make every effort to prohibit any form of payment for services to these providers that either devalues their services or contains fee-for-service incentives. We must be aware of the consequences of developing a payment schedule that provides only for physician-surrogate services.

--Finally, we must avoid all the sexist biases that permeate the past history of the health professions. (A recent survey of over 1,000 physician assistants, completed by the American Medical Association, indicated that 17 percent were women. The mean salary for men was $11,995 and for women with equivalent training $9,900.)[15]

Perhaps all of these might be summed up in a plea to consider these new practitioners as a means to improve our system of care, rather than a group of foreign bodies to be assimilated by it.

Finally--

The moral of these fables is that anyone who falls on his face in public--either in a sheep pasture or a scientific meeting--is likely to make a mess of things.

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FEDERAL POLICY ON HEALTH MANPOWER

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I certainly welcome the opportunity to join in this timely and important conference on health manpower. The Institute of Medicine is to be congratulated not only for its sponsorship of this meeting but also for the major contribution it has made to a fuller appreciation of the complex, and I might say urgent, question: how do we approach health manpower problems in this country?

In one key respect, we are literally at the eleventh hour when it comes to health manpower. For, as I am sure everyone here knows perfectly well, 52 days from today the entire statutory base for Federal support of health manpower training will expire.

Under the circumstances, one might easily say that the time for sober contemplation has passed. The legislative process being what it is, there is scarcely enough time to enact the fundamentally new legislation that most of us would agree is needed, let alone to ruminate about what form that legislation ought to take.

But, of course, the fact of the matter is, all of us--in government and out--have for many months been engaged in an exhaustive analysis of where we stand in the health manpower field, where we go from here, and what part the Federal government ought to play in the future. And, while obviously we have not reached universal agreement on any of these topics, these months of work have formed the basis for the development of a number of policy papers that are being widely discussed within the Administration.

I think it would be appropriate for me to take the next few minutes to share with you, in capsule form, at least, the conclusions that were reached about trends and needs in the manpower field, and then to outline what is being considered in terms of a continued Federal involvement.

Perhaps the best way to begin is to take a look at how we got to where we are. During the past decade, the nature and extent of Federal intervention into the national health care system and its associated education and training programs have grown enormously. Only 10 years ago, the Health Professions Educational Assistance Act (HPEAA) was passed--an event that marked the beginning of the Federal role in providing direct support for the education of health professionals.

Initially, the primary policy objective was to increase the aggregate supply of physicians. Numerous studies, such as the "Bane Report," had convinced the Congress that a health crisis would result unless the production of physicians was substantially increased. Public attention was focused on the fact that the supply of M.D,s was not keeping pace with the growth in population. As the Federal government became more involved in the task of alleviating the shortage, the objectives of Federal policy became more complex.

The Health Professions Education Assistance Act was amended at various times to provide for the accomplishment of additional objectives, such as curriculum reform, maintenance of accreditation, and the recruitment of minorities. The Federal role was also expanded to include a responsibility for maintaining the financial viability of the schools. During the late 1960s, the special improvement grants were provided to assist schools that were in serious financial straits.

In 1969, concern over the issue of supply adequacy was intensified. Government reports indicated that there was a shortage of 50,000 physicians, 200,000 nurses, and almost 150,000 technicians. In 1970, the Carnegie Commission issued a report, "Higher Education and the Nation's Health." The Commission concluded that medical and dental education were critically under-funded and recommended that the Federal government play a major role in the financing of health manpower education. Many of the recommendations contained in the Carnegie Commission report were reflected in the Comprehensive Health Manpower Training Act, which was enacted in 1971.

This legislation represented a significant departure from previous national policies. It was based on the principle that Federal financing is necessary for the regular operational support of schools of the health professions. The Comprehensive Health Manpower Training Act includes five types of institutional support: capitation, start-up, construction, financial distress, and special projects.

Capitation awards were conditioned upon increased enrollment, thus providing strong incentive to increase the production of health professionals. The Act also included authorities to address the distribution problem--specialty and geographic distribution, as well as minority representation.

Health manpower programs developed under the HPEA legislation have had a significant impact:

--They have substantially increased the national capacity to train health professionals. Since 1963, Federal programs have assisted in the building of 21 medical schools, nine dental schools, and one school of osteopathy.

--They have encouraged a substantial growth in enrollment, thus providing for a significant increase in the number of students that can be expected to graduate in the future. First-year enrollment of U.S. medical schools grew from 8,800 in 1965 to 13,400 in 1972. Although it is impossible to measure the exact impact of Federal dollars, we estimate that about 3,500 new first-year places can be attributed to Federal support.

--Schools receiving financial distress awards have decreased because of the large increase in other forms of institutional support, particularly capitation, and the requirement that schools take measures to increase their administrative efficiency. In 1971, 71 awards to health professional schools were granted for approximately $50 million. In 1973, the amount fell to $9.2 million and only 18 schools.

--Federal programs have facilitated the increased enrollment of minorities. First-year enrollment of black students in U.S. medical schools has increased from 4.2 percent in academic year 1969 to 7.1 percent in 1972. There has been a corresponding increase in the enrollment of females in medical schools. Although it is not possible to arrive at a precise estimate, indications are that Federal programs have played a substantial role in bringing about this change.

--Federal programs have not been particularly effective in solving the problems of specialty and geographic distribution. Even with the large increases that have occurred in the supply of physicians, the problems of specialty and geographic distribution have worsened.

--With the exception of the support for programs in family medicine, Federal funds have not been generally available to start up primary care training programs based outside of the hospital.

--Health manpower programs have been expensive and have created a dependence on the Federal government. Over the past 10 years, the Federal dollar commitment has grown markedly. Annual obligations for health manpower programs (not including research training or expenditures for mental health manpower) increased from $65 million in 1963 to $536 million in 1973. Between 1963 and 1973, a total of approximately $3.4 billion was obligated for the training of health professionals. Federal funds from all sources now account for at least 50 percent of the revenue to U.S. medical schools. The Federal government has become the major financier of medical education. Other sources of support, such as tuition payments, have actually declined in terms of their contribution to total revenue.

Continuation of current Federal policies will have important implications for the future. The HPEA legislation provides substantial incentives further to increase enrollment levels. This will eventually lead to an oversupply of health professionals, particularly physicians.

There are some serious disadvantages to having too many doctors. Apart from the obvious factor that money spent to train an excess of physicians could probably be used more effectively for other purposes, it is also clear that the conventional supply and demand equation does not always apply with respect to health care. One could make the argument that more doctors create more demand. And the almost certain result is a rise in the price of health care services, rather than a lowering of it.

If current enrollment levels are maintained, we can expect that by 1985 the supply of physicians will increase by more than 50 percent, dentists by 40 percent, and registered nurses by more than 60 percent. The projected increase in the number of physicians depends on the future inflow of foreign trained physicians.

If the net flow of foreign medical graduates to the physician manpower pool were reduced to zero by 1975 and remained there, we would have 460,000 physicians by 1985. On the other hand, if the net flow of foreign medical graduates were between 3,500 and 5,500 annually--a reduction of approximately 40 to 60 percent of the 1972 levels--then by 1985 the U.S. physician pool would number between 495,000 and 520,000.

These projected increases in supply are even more significant when viewed with the population growth expected for the future. The Bureau of the Census recently reported a population growth rate of 0.8 percent, which is the lowest net increase since 1938. Using a more conservative projection, Series E, which assumes a population growth rate of slightly greater than one percent, the physician/population ratio is expected to increase substantially from 158 in 1970 to between 207 and 217 in 1985.

Population growth is only one of the variables influencing physician requirements. We also considered how changes in insurance coverage and provider productivity will affect manpower requirements. Using what we considered to be a reasonable range of estimates for demand and productivity, we estimated that by 1980 physician requirements would be between 400,000 and 450,000. This compares wthh a supply projection for 1980 of between 430,000 and 450,000.

I should like to point out that the physician requirements estimates that we developed did not take into account the potential impact of PSROs. In this regard, it is important to point out that quality assurance is not necessarily predicated upon an increase in the supply of physicians' services. Also, it cannot be assumed that the number of physicians relative to the population is an indication of the level of health of any segment of the population

Quality assurance efforts are likely to impact upon professional standards or norms. In the process of defining what is "appropriate," there are likely to be substantial shifts in the utilization of services. Although definitive information is not available, we do expect that PSROs will reduce unnecessary admissions and the overall length of stay in acute care hospitals. PSROs are also likely to impact upon the requirements for and subsequent utilization of specialty services.

Our overall expectations with respect to supply and requirements obviously raise the critical question of whether the Federal government should continue to propagate policies which would encourage continued expansion in the output capacity of U.S. medical schools.

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Recently, there has been a growing concern for the problem of specialty and geographic distribution. It is becoming increasingly apparent that these are the critical issues to be faced in the decade of the 70s. In the past, Federal policies were concentrated on increasing the aggregate number of health professionals. We have learned, however, that producing more will not necessarily solve distributional problems.

During the 1960s, there was a substantial increase in the supply of physicians. However, the number of primary care physicians, especially those in general practice, decreased sharply. At the same time, there are strong indications to suggest that we have graduated too many surgeons, radiologists, and nurses. As a result, primary care is often delivered by high-priced specialists in expensive settings.

Population groups in rural areas and in the inner city have had difficulty in gaining access to health care. While we were experiencing a large increase in our physician per 100,000 population ratio during the 1960s and early 1970s, disparities in the distribution of physicians by states actually worsened. Loan forgiveness has been the principal mechanism adopted for altering geographic distribution, but experience to date seems to indicate that this form of financial incentive is not effective.

In the past, schools of the health professions have received increasing amounts of institutional support. These funds have been utilized to offset operating costs. At the same time, they have made it possible to keep tuitions low, relative to the overall cost of medical education. A review of the distribution of tuition charges by schools shows that 80 percent of the publicly supported institutions charge resident students $1,200 or less, and 70 percent of the private schools charge students $3,000 or less.

A continued growth of institutional support without a corresponding increase in tuition seems to be inequitable, especially when one considers the rates of return among the medical profession. I might add that no other group receives such large Federal subsidies.

Given these facts, we are drafting new legislation which will be based on the following strategy:

1) As a matter of priority, Federal dollars should no longer be used to stimulate increases in enrollment capacity. Further increases, either through the building of new schools or the expansion of existing places, could lead to a surplus. We want to avoid the problems that developed as a result of overinvestment in such fields as education or engineering. In the future, Federal policies should be designed to maintain output capacity.

In reviewing the forms of support that would accomplish this objective, we concluded that capitation should be viewed as a source of Federal support for the schools, which is provided primarily for the educational programs, but also in recognition of the broader role these institutions play in the health care system. However, we found little rationale to substantiate current levels.

A complete and immediate reduction of capitation support would be very disruptive to the schools and would likely result in a drop in enrollment. A phase-down of capitation support would provide the time to make necessary financial adjustments, Also, phasing down capitation levels would provide time for higher enrollment levels to become firmly established.

A complete elimination of capitation could have a drastic impact upon the financial viability of institutions that are a national resource. A capitation program is necessary to balance the effects of other large revenue sources, particularly Federal expenditures on biomedical research.

Furthermore, we feel that we have made a moral commitment to the institutions and to the students who were accepted as a result of Federal initiatives. Students admitted on FY 1974 capitation money will not be graduating until 1979.

The effect of this action will be monitored closely. It is designed to encourage the schools to rely more heavily upon state revenues and tuition as a source of support. It is also designed to free up monies, which can be used for targeted objectives. Much of the resources that are saved as a result of this reduction could be used for special projects, particularly those designed to increase the number of primary care physicians.

2) Federal policy should be more closely targeted to the attainment of specific output objectives, such as increased provider productivity, increased numbers of physicians in primary care, greater efficiency in the educational process, and improved geographic distribution.

To accomplish these objectives, we will propose combining current project grant programs in the health professions, nursing, public health, allied health, and the health manpower education initiative program. This authority will be used to support an array of projects, such as training in primary care, including family medicine, increasing enrollment of minority and low-income groups, curriculum improvements, development of physician and dental assistants, and maintaining support to Area Health Education Centers (AHEC).

Because of the implications with respect to cost and access, this authority will be used to encourage increased productivity among health care providers. Many of the tasks performed by physicians and dentists can be performed by other less expensive health workers. Increases in productivity of physicians and dentists could have a higher payoff in terms of reducing the future requirements for these providers. A number of studies have shown that a physician assistant can increase a physician's productivity by between 30 and 70 percent. It is in the interest of the Federal government to support efficient delegation, and this is an opportune time for emphasizing appropriate task delegation and encouraging physician extender training programs.

3) Medical students should bear a larger portion of the medical education costs. Large public subsidies to highly paid professions are inequitable and unnecessary (especially where the demand for admission to schools far outstrips the supply of available places). Even if physicians

and dentists paid their full educational costs, their education would still be an excellent personal investment. However, if a larger portion of the cost of education is to be shifted to the student, it is essential that we have an adequate loan and scholarship program.

Students needing financial assistance will be able to take advantage of an improved and expanded guaranteed student loan program for their graduate level training. We are proposing that the total loan ceiling be increased from $10,000 to $25,000, and the annual ceiling would also be increased. Several other improvements would be added to make loans more accessible. In addition, nursing students in both college and hospital training programs, as well as other health professional students in undergraduate training in need of financial assistance, will have access to the Basic Opportunity Grant (BOGS) program, administered by the Office of Education.

A health scarcity area scholarship program would be established. It would require a service commitment in Federal health service programs or in scarcity areas. The financial penalty for default would be strong.

4) Federal programs should be a complement to, rather than a substitute for, other forms of support.

Adoption of this strategy imposes a responsibility to assure that enrollment levels are maintained and that productivity continues to increase. The production process must be monitored closely to ascertain the impact of Federal initiatives and to update and refine elements of the supply-demand equation.

This strategy for U.S. action is designed to attack immediately what we perceive as the major obstacles to health manpower sufficiency, to protect the significant achievements we have made in health manpower development over the past few years, and to provide the opportunity for taking the initiative in addressing health manpower problems as they are identified.

The success of this design relies heavily upon continuing the innovative responsiveness demonstrated by the nation's health professions' educational institutions in addressing previous health manpower demands.

HEALTH MANPOWER PROBLEMS:

THE CANADIAN EXPERIENCE

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Under Canada's federal system, primary responsibility for both health and education resides at the provincial level. With ten provinces that differ in size, needs, and resources, it is not surprising that there are considerable differences in approach to organization and delivery of health services. The possible hazards of inconsistencies or serious disparities between provinces are overcome by federal coordination and financial incentives to the provinces.

Areas of Emphasis in Health Policy

Certain areas of emphasis mark the stages of evolution of health policy in Canada during the past two decades. Following World War II, primary concern centered on the elimination of financial barriers to necessary medical services. In 1958, hospital insurance was introduced; ten years later, medical care insurance was added. In both cases the insurance plans are now administered by the provincial governments with sharing of costs by the federal government. The plans are financed principally from general tax revenue, but about 25 percent of the costs are met through premiums related to the level of taxable income of the individual or family. Canadians now have universal health insurance. The only items not covered are dental services and prescription drugs.

The second major area of emphasis in Canadian health policy was health manpower. Responding to the Report of the Royal Commission on Health Services, the federal government established in 1965 a $500 million dollar Health Resources Fund to be spent over fifteen years to assist the provinces with the expansion and upgrading of facilities for education of the health professions and for medical research. Responsibility rested with the individual province for selecting the projects and for providing matching dollar support. Since 1965 four new medical schools have been added and most of the existing twelve medical schools have expanded to achieve more than a doubling of capacity for undergraduate and postgraduate medical education. During the same period there has been a more limited expansion of dental education with the addition of two new dental schools. The fund has provided some assistance for the other health professions and technologies chiefly where their programs have been related to university health science centers. The largest single category of expenditure under the Health Resources Fund has been for the construction, expansion, and upgrading of teaching hospitals. Other types of health service facilities have received little attention. Three results of the Health Resources Fund are already apparent. First, it has greatly increased the capacity of Canadian educational institutions to train health personnel; the full benefit of this will be realized by 1978. Second, in addition to expanding capacity, it has led to a regrouping or coordination of educational programs for the health professions in health science centers. Third, the substantial investment in active treatment teaching hospitals has reinforced this linkage in medical education, and the provision of clinical resources for the teaching programs of other health professions has, by comparison, been neglected.

The third major area of emphasis in health policy in Canada has been the organization of health services. Responding to concern about rapidly rising capital and operating costs of active treatment hospitals and duplication of expensive facilities, government has increased pressure to rationalize the system of health services. Initial emphasis was on institutional health services, particularly active treatment hospitals, and attempts were made to coordinate their services on an area-wide or regional basis. The concept of regionalization has now been accepted in all the provinces and has been translated into legislation in some. As this process is being slowly implemented, however, attention has shifted to the organization of services outside the institutional setting, in particular primary care. Two aspects of this process are important. The first is the establishment of some organizational base for the delivery of primary care services in the community, and the second is the coordination of these primary care services with the secondary institutional services. The purposes and advantages of this process are sufficiently familiar that they need not be detailed. There are implications, however, for health manpower in terms of the quantity of primary health personnel trained, the environment for their education, and the opportunity for teamwork in the delivery of this important aspect of health care. The nature and organization of this system of health services, particularly primary health services, is of critical importance to the matters of manpower forecasting, effective distribution of health personnel and effective utilization of the skills for which they have been trained.

The most recent area of emphasis in health policy has been the extension of government interest from the problems of human biological science and the organization of health services to studies of the effect on health of external and environmental factors, personal habits, and mode of living. It has become increasingly apparent that death and disability from trauma, lung cancer, coronary artery disease, and mental disorders will not be significantly lessened without fundamental changes in the attitude, behavior and way of life of most members of society. Factors in life style and community behavior, which cannot be reached through the health care delivery system, have been identified as being of critical importance for the maintenance of health. A strategy for action in these areas has been developed but programs have not yet been implemented.

One sector of health policy which has received much less emphasis in Canada than in the United States is health research. During the 1960's, the growth of biomedical research in Canada was much slower than in the United States, and Canada relied to a large extent on the international pool of scientific knowledge and personnel. Consequently the impact of biomedical research on education of the health professions and on our teaching hospitals has been much less extensive. During the past five years, the federal government has directed special attention to research on problems associated with the cost, quality, and distribution of health services and the evaluation of innovations in the delivery of health care. This has been achieved through a separate National Health Grant. Interest in this field of research has grown rapidly, but the limiting factor in progress to date has been the scarcity of personnel who combine the necessary research skills with knowledge of the system of health services.

Judging by the level of expenditure, Canadians attach considerable importance to health services. International comparisons suggest that total expenditures on health services in Canada expressed as a percentage of GNP are higher than in the United States and most other western countries.

Health Manpower - Current Status

Ideal levels for health manpower have not been established in Canada, but one senses that adequacy of supply has now been reached in most of the health professions. Data compiled by the Department of National Health and Welfare illustrate the manpower resources available in 1971 for some of the health professions.

TABLE I

	Total Number	Ratio to Population
Physicians	32,625	1:661
Nurses	114,303	1:186
Dentists	7,664	1:2,814
Pharmacists	11,330	1:1,904
Optometrists	1,511	1:14,275
Physiotherapists	2,287	1:9,431

For the purposes of this presentation discussion will be restricted to the current manpower status of the three major health professions: medicine, nursing, and dentistry.

Medicine

The overall supply of physicians has increased rapidly and the current ratio to population is much more favorable than the target proposed by the Royal Commission on Health Services in 1964. The unexpected improvement may be explained by the fact that during the period 1965-70, the number of foreign medical graduates registered each year exceeded the output of our own medical schools. Of the physicians active in practice in Canada in 1972, 31 percent were graduates of foreign medical schools. If the immigration of physicians continues at the current rate of about 1,000 per year, and there is no change in the current enrollment patterns in Canadian medical schools, then the number of physicians in Canada will continue to increase at a much greater rate than population, and the ratio projected for 1981 would be 1:488.

Differentiation of the role of physicians is well established and over half of the physicians in practice are certified specialists. Specialists are not confined to a consulting role and may engage in primary medical care.

Most practitioners are paid on a fee-for-service basis in accordance with a fee schedule negotiated between the provincial medical association and the provincial government. The net professional earnings of general practitioners are at the lower end of the spectrum of remuneration for physicians but not strikingly different from the earnings of internists, pediatricians, and psychiatrists.

TABLE II

Median Net Professional Earnings of Active Fee Practice Physicians by Specialty, 1971

General Practice	$35,310
All Specialties	44,572
Pediatrics	38,391
Internal Medicine	37,402
Psychiatry	34,426
General Surgery	45,581
Orthopedic Surgery	54,717
Average of all physicians	39,509

There has been no attempt in Canada to introduce new categories of health personnel comparable to the physician assistant in the United States. In the field of primary medical care, nurses have been trained to work with family physicians as office-based nurse practitioners.

Nursing

The supply of nurses has increased rapidly over the past five years, from expansion of our own nursing schools and from immigration. In 1971, the ratio of active nurses to population had reached 1:186 and, making allowance for the significant number of nurses who work part-time, the full-time equivalent nurse ratio to population was estimated to be 1:209. In 1971, the sources of supply of registered nurses were 10,058 from Canadian nursing schools and 2,237 trained in foreign countries. Only 5 percent of the graduates of Canadian nursing schools were from basic baccalaureate programs in universities; the remainder graduated from diploma programs, originally associated with hospital schools of nursing but are now in the process of being incorporated into the post-secondary educational system.

In 1971, 83 percent of nurses were employed in hospitals or other institutions and only 2.7 percent in physicians' or dentists' offices. Specialization is an increasing trend in nursing but represents only a small percentage of nurses in active practice.

The principal nursing auxiliary is the Registered Nursing Assistant, of which there were about 30,000 in 1970, employed almost exclusively in hospitals. The output of training programs for Registered Nursing Assistants has been relatively constant at about 5,000 per year for the past five years.

In general, there appears to be an adequate supply of nurses from our own nursing schools, but the employment opportunities outside the hospital setting remain limited. Problems of manpower distribution arise because of the limited employment mobility of married nurses. As a result, for the past few years some nurses have been unable to find employment in metropolitan areas while shortages exist in smaller centers of population.

Dentists

In 1971, the ratio of dentists to population in Canada (1:2814) ranked well behind the United States (about 1:2000) and was only half as favorable as in the Scandinavian countries (1:1200 - 1:1500). The nine dental schools in Canada graduated a total of 363 dentists in 1971. In contrast with medicine, immigration has only accounted for about 10 percent of the new registrations in dentistry in Canada over the past five years.

Role differentiation is not as advanced in dentistry, and in 1971 approximately 8 percent of dental practitioners were specialists. Dental specialists in Canada restrict their practice to referred patients.

There is increasing acceptance by dentists of the value of dental assistants and hygienists, and with experience many dentists have been encouraged to extend the scope of responsibilities delegated to these auxiliary personnel. Recently there has been renewed interest in the New Zealand type of dental auxiliary whose practice is much less directly supervised by dentists. In Saskatchewan, a training program has been launched to prepare this type of dental auxiliary to work in the public health system, primarily with children.

There is some shortage of dental manpower at the present time but this will become much more acute if health insurance is extended to cover dental services in Canada. At the present time, only about 3 percent of the population has insurance coverage for dental services through private plans.

The Problem of Geographic Distribution

In spite of the increasing supply of all types of health personnel, uneven geographic distribution remains as a major manpower problem, particularly in the professions whose members are predominantly self-employed. Since the introduction of medical care insurance, the number of physicians in under-serviced areas has improved significantly. However, the ratio of physicians to population in Newfoundland and New Brunswick is still far behind the national average and only about half the level found in the more affluent provinces, British Columbia and Ontario. For dentists, the disparity is even greater, and a fourfold difference in ratios exists between Newfoundland and British Columbia. Furthermore, manpower studies in the provinces with the most favorable ratios to population have shown major inequities of regional distribution and many communities have been identified that are under-serviced, particularly in the sparsely populated areas.

TABLE III

Ratio of Active Physicians and Licensed Dentists to Population, by Province of Registration, 1972

	Ratio to Population	
	Physicians	Dentists
Newfoundland	1:1,056	1:8,313
Prince Edward Island	1:1,076	1:3,229
Nova Scotia	1:692	1:3,267
New Brunswick	1:979	1:4,367
Quebec	1:626	1:3,375
Ontario	1:586	1:2,316
Manitoba	1:631	1:2,979
Saskatchewan	1:804	1:3,770
Alberta	1:677	1:2,562
British Columbia	1:584	1:2,048
CANADA	1:633	1:2,735

Source: Health Manpower Planning Division, Department of National Health and Welfare, 1973.

No comprehensive policy has been developed to address the problem of uneven geographic distribution of physicians and dentists. New medical or dental schools have been started in certain provinces with apparent benefit even before graduates emerge. Some established schools have initiated outreach programs to provide clinical experience for residents and senior undergraduates in under-serviced regions, with the hope of attracting these individuals back to practice in such regions. In Ontario, substantial progress has been made in rectifying gross inequities of distribution by providing special educational opportunities for individuals resident in under-serviced areas and bursary assistance for medical students willing to practice in such areas, by offering establishment-of-practice grants and by guaranteeing an attractive level of minimum income during the initial years of practice. Using these techniques since 1969, 178 doctors have been placed in 95 communities and 55 dentist in 53 communities which had been identified as under-serviced. The program now has sufficient momentum that little difficulty is anticipated in filling the remaining vacancies, 70 for general practitioners and 18 for dentists. This type of program, however, only deals with the primary level of care in grossly under-serviced areas. The overall pattern of distribution of manpower is still grossly uneven and there are many regions that lack the services of medical and dental specialists.

The Problem of Differentiation of Role

The problems of manpower distribution are further complicated by the proliferation of health professions and by the differentiation of individual professions into generalists and specialists of different types.

Both processes tend to divide up health services into a series of compartments or territories, each identified with a single profession or specialty rather than with the overall objectives of health care.

In Canada, there has been strong resistance to the creation of new health professions to meet new types of health service needs. Instead, we have looked to the adaptation of existing manpower resources through continuing education or short programs of recurrent education. For example, rather than introduce a new professional entity such as the "physician assistant," experienced nurses have been given the equivalent of six months' additional training to prepare them to work with physicians in the delivery of primary care in the ambulatory setting. (A detailed review of the nurse practitioner program sponsored by the schools of medicine and nursing at McMaster University has been recently reported in the *New England Journal of Medicine*). With this approach, the time-frame of response is much shorter, public and professional acceptance is more readily achieved, and the problems of dead-end careers, portability of credentials, and licensing are substantially reduced.

The process of specialization is affecting all the professions in Canada but it is only in medicine that it presents a significant problem. During the past decade, the number of specialists in Canada has increased by 70 percent while the number of general practitioners has only increased by 19 percent. Data obtained as of December 1972 revealed the following distribution of active physicians:

General Practitioners	12,781
Specialists	14,139
Not in private practice	1,690
Interns and Residents	5,898
	34,508

In contrast with the United States, nearly half of the doctors in active practice in 1972 were still in general practice and this career continues to be the choice of the majority of graduates of Canadian medical schools. On the other hand, many of the foreign medical graduates coming to Canada enter at the level of postgraduate training and end up in specialty practice.

To date, the only measures adopted to rationalize the supply of primary care physicians and specialists of different types have been introduced by the medical schools in their postgraduate training programs. In 1965, by agreement with the Royal College of Physicians and Surgeons of Canada, which controls all specialty examinations, full responsibility for the planning, organization, and supervision of all residency training leading to specialty qualifications was transferred from individual hospitals to medical schools. At that time the chief purpose was quality control of the training programs. However, the centralization of the management of postgraduate education in the medical school has made it much easier to establish guidelines for the size of different training programs than would have been the case if responsibility had continued with the individual teaching and non-teaching hospitals. The size of residency training programs is still strongly influenced by the service needs of teaching hospitals and these needs will have to be met in other ways if the number of residents in specific programs is reduced on the basis of projections of manpower need in that specialty.

As part of the process of qualifying for capital grants during the past five years, medical schools have been asked to define their plans for residency training. In some provinces, guidelines have been established for the total capacity of postgraduate training programs and priorities established for certain types of trainees. In Ontario, for example, the number of residency training posts associated with each medical school is limited to a number equivalent to its undergraduate enrollment. Furthermore, opportunities for postgraduate training in primary medical care must be provided for 50 - 60 percent of the medical graduates. The remainder of the places are divided among the various specialties. The manpower needs for individual specialties are being studied, using among other techniques the information derived from the health insurance system. However, apart from a few examples of obvious surplus or shortage, there is insufficient evidence on which to base firm manpower projections in most specialties.

To date, in Canada, the only approach to the solution of manpower problems has been through changes in the output of undergraduate and postgraduate educational programs. This is unsatisfactory for the following reasons:

--Major changes, such as the establishment of a new school or training program, involve a long lead-time. The interval between recognition of a need and appearance of graduates in significant numbers from the program is rarely less than 6 - 7 years and usually longer.

--Manpower forecasting is extremely unreliable and involves many variables that are not controlled by or linked to the educational system, e.g., changes in the incidence and management of disease, the role of other health professions, the methods of delivering health care, especially primary care, or changes in the rewards and recognition of different types of practice.

--The problems of uneven geographic distribution of health personnel can only be influenced to a very limited extent by changes in the educational programs. Increase in supply alone seems to have little impact on interregional differences of medical manpower.

--The solution of manpower problems devised in our medical schools will almost certainly be ineffective when half of the new physicians registered each year have been trained in other countries.

If we are to have manpower policies that deal effectively with total numbers and the mix of specialists of various types, the policies must relate to both sources of manpower supply: our educational programs and immigration. Furthermore, if we are to resolve the serious inequities of geographic distribution of health personnel, the emphasis must shift from manipulation of the production machinery in our professional schools to controls at the level of utilization or deployment of health personnel.

The Problem of Oversupply

In Canada, we have moved rapidly from a position of relative shortage to one of impending surplus. Indeed, in British Columbia and Ontario the physician-population ratio is already well under 1:600 and may be expected to reach 1:500 within the next few years if the current sources of supply continue unabated. At present the supply of physicians is derived almost equally from the output of Canadian medical schools and from immigration of physicians trained in other countries. Due to the expansion of our medical schools over the past ten years, Canadian universities are now in a position to train sufficient physicians to maintain and even improve our physician-population ratio without immigration and allowing for the current rates of attrition and loss through emigration.

The surplus of medical manpower may at first sight seem attractive but more careful examination reveals several undesirable consequences. First, the number of doctors in practice is the prime determinant of the total cost of health services, since costs attributable to physicians are not only their fees for service but also the expenditures elsewhere in the health services system which result from their professional decisions. Second, the increase in doctors will reduce the volume of work or number of procedures per doctor; this in turn may increase the cost per unit of work, decrease the quality of the services rendered and reduce the professional satisfaction. Third, in addition to decreasing productivity, a surplus of doctors may displace other professions from their role in the delivery of health services.

At this stage, therefore, it is necessary to make a choice either to limit immigration or to reduce the output of our medical schools. As long as shortages exist in some regions of Canada and in some branches of medicine there will be strong public resistance to placing rigid restrictions on immigration. On the other hand, if we cut back on the output of our medical schools and continue to accept large numbers of foreign medical graduates we will waste capacity which has already been developed in our medical schools and at the same time sacrifice an assured source of future supply of physicians. Furthermore, it seems doubly unjust to drain skilled manpower from less well-developed countries and at the same time deny a career opportunity in medicine to well-qualified young Canadians who currently seek admission to our medical schools. (At the present time there are at least two well-qualified Canadian applicants for each place available in our medical schools.) Finally, for Canada's own manpower objectives we are concerned about the maldistribution of physicians, imbalance between generalists and specialists, and underrepresentation of women, native peoples, and ethnic groups. But any innovative or remedial approaches we devise in our medical schools will probably be negated if the majority of new physicians registered each year have been trained in other countries.

The solution to the problem of oversupply does not lie either in curtailing production by our medical schools or in placing rigid restrictions on immigration. As noted previously, as long as shortages exist in some areas--and this is the case in certain provinces and with certain types of physicians--there will be strong resistance to limitations on immigration. The principal mechanism used to date to overcome shortages has been the "super saturation spillover" approach which is extremely expensive and relatively ineffective. Incentives have been used in some provinces as a short-term measure to meet the needs of under-serviced areas, but in the long run a method is required which will deal not only with the shortages but also with the problem of oversupply. In my opinion, this can be best achieved by introducing controls at the level of utilization of physician manpower.

One approach is the establishment of "upper limits" on the number of physicians by geographic region and by the type of general or specialty practice in which they engage. The upper limits should be in accord with guidelines developed by a provincial or national manpower advisory council and should be subjected to regular review and modified as required. The mechanism of implementing the manpower limits would be to require all physicians to apply for practice privileges to a regional or district health services council, much in the way individual physicians now apply for hospital privileges. The manpower limits could be applied for the province as a whole but this would be less effective in meeting the need for more equitable distribution of physicians among the various regions of the province. Individual regions should retain some authority to substitute between different types of physicians and other health personnel, and to exceed the established limits by financial trade-offs with other health resources in relation to local needs.

There are other approaches that might be used to restrict utilization of medical manpower. The most frequently proposed is licensing, but licensing deals with minimum acceptable professional qualifications and in a situation of oversupply the basis of selection should be the highest standard of qualifications. Furthermore, since licensing is normally related to a larger jurisdiction, such as a province or state, it is not possible to influence regional geographic distribution within the jurisdiction by this mechanism. A second approach would be to limit the number of physicians whose services would be covered as insured benefits under the government-sponsored health insurance plan. This approach, if used in isolation, could create a private practice system alongside the publicly insured system and the public might experience problems in the selection of physicians whose services were covered by health insurance.

The concept of establishing upper limits on the number of physicians by geographic region would require regional authorities with much greater knowledge of and responsibility for health services of that area, and more sophisticated information on the appropriate numbers of physicians of different types and the nature of the practice in which they engage. A good deal of information on recent experience is available from the hospital and health insurance data files, however, a great deal of additional work would be required before such a concept could be implemented on a regional basis. The effort may be worthwhile, however, because the implications of the concept are much broader than meeting the need for more effective distribution of physicians. It has already been pointed out that the most important multiplier of health costs is the number of physicians practicing in the system. In some provinces, there is impending oversupply and in certain surgical specialties a surplus already exists. For example, the ratio of neurosurgeons to population is four times as great in British Columbia as it is in Newfoundland, but the number of major neurosurgical procedures per capita is approximately the same in the two provinces. If there is no limit to the number of physicians who may register in a province or region and no more efficient mechanism to achieve distribution by location and by type of practice than the "super saturation spillover" process which now prevails, then the escalating costs from surplus physicians will almost certainly negate attempts to achieve economies in other sectors and without benefit in terms of the supply or standard of health services. Furthermore, a surplus of specialists may have other steering effects on the system of health services which are undesirable.

The introduction of upper limits on the number of physicians is, therefore, not only an important measure in achieving optimal geographic distribution of general practitioners and specialists in relation to need but also a key factor in solving the problem of cost control. In addition, by placing the controls of manpower at the level of utilization, it provides a more tangible basis on which manpower forecasts can be developed as a guide to those responsible for planning the programs of basic and specialized professional education. With the system proposed, Canadian or foreign medical graduates could be considered for vacancies in a region on the basis of their professional qualifications, thereby obviating the need to introduce rigid restrictions on immigration.

The federal-provincial conference of ministers of health, held in February 1974, recognized that Canadian medical schools would soon be producing sufficient physicians to meet our manpower needs without reliance on immigration and, that if immigration of physicians continued at the present rate, there was a potential problem of oversupply. Consensus was reached on a collaborative federal-provincial policy to achieve the following objectives: First, a better balance between the requirements for physicians of all kinds, taking into account the role of allied health workers and the two sources of supply--Canadian medical schools and immigration. Second, to give a higher priority to Canadian students aspiring to a medical career and to Canadian graduates wishing to practice in Canada. Third, to promote a better distribution of physicians' services, particularly in rural areas, as well as to relate specialty training to community needs. The ministers indicated that well-coordinated measures must soon be taken to achieve these objectives considering the varying circumstances in each province. Some of the options to be considered include physician quota systems by regions, appropriate medical school enrollment, and restrictions on immigration. The process of consultation with the provinces on preferred mechanisms is already underway and immigration regulations to Canada have been modified to include consideration of occupational demand. If there is no effective demand the immigrant may not be admitted, but if he has a specific position to fill or is applying to an area with identified vacancies he can be admitted. These new immigration regulations have a general application and are not confined to physicians. The changes which have been introduced make provision for regional under-serviced areas and provincial agreement is required before the demand category can be set at zero for Canada.

Summary

Canada has now arrived at the stage of adequacy of supply from its own educational institutions of almost all categories of health manpower. Measures are being introduced to limit immigration in occupational categories where there is no effective demand at the provincial level. Educational changes and incentives to redistribution of medical manpower have met with some success but major improvements in the distribution of physicians by geographic area and by type of practice in relation to need must await the introduction of control mechanisms at the level of utilization of physicians in a province or region. The establishment of upper limits for the number of physicians by type of practice in a geographic region offers a promising approach to the distribution of medical manpower and to the control of costs of health services, and at the same time preserves the flexibility to permit individual regions to adapt to their special needs. It also links the changes in medical manpower to the evolution of patterns of practice.

Emphasis on utilization does not mean modifications of sources of supply are unimportant. Indeed they are critical to the type, quality and attitude of future health personnel. However, for the reasons given, manipulation of production machinery alone will not solve the problems unless associated with matching and complementary changes in the utilization machinery. Since the latter has a more immediate effect it is also a more sensitive method of making on-going changes in response to changing needs.

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SUMMATION

John Iglehart
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First of all, is there a supply problem? The answer at the conference has been a qualified 'yes.' The qualifications are complicated because some would say that the problem is undersupply and some would say that the real problem is, or soon will be, oversupply. This division of opinion not only wracks the worlds of medicine and academia; Federal policy-makers also differ on the question.

Dr. DuVal reminded us that a 1959 report, authored by Frank Bane, estimated that there were approximately 250,000 physicians in the U.S., making a ratio of 149 physicians for each 100,000 population. Last year, there were 360,000 physicians in the U.S., making a ratio of 173 doctors for every 100,000 population. And by 1990, HEW estimates, there will be more than 400,000 physicians in the U.S., making a ratio of 237 physicians for every 100,000 persons. So in the space of three decades, the ratio will have increased from 149 to 237 physicians per 100,000 population, an increase that led Dr. DuVal to conclude that "in terms of supply, the U.S. is well on its way toward closing such gaps in numbers as has ever been projected."

He seemingly discards any notion that American medicine is going to change anytime soon--that it will abandon the fee-for-service concept for the HMO world--and not be subject to the forces of competition. And, therefore, he concludes that "restraint would appear to be in order as regards the development of policies that would put us toward any further substantial increase in physician output."

Dr. DuVal's successor at HEW as assistant secretary for health, Charles Edwards, also is urging restraint. But he does it in a more dramatic fashion, saying that oversupply is upon us. His position, though, is somewhat influenced by the unwillingness of the Nixon administration to continue Federal subsidies for health manpower schools at their present levels.

Canada, John Evans tells us, faces the same problem of an oversupply of physicians as perceived by Drs. Edwards and DuVal.

The other side of the question, though--whether our country still faces an undersupply of physicians--has not been articulated at this conference, at least not within my earshot. But the legislator who perhaps more than anyone else will influence the shape of the Comprehensive Health Manpower Act of 1974, and I speak of Paul Rogers, believes that a shortage still exists. And he feels, further, that the enactment of national health insurance would exacerbate the shortage.

Moreover, looking at the state level, the Ohio state legislature has just authorized the development of two new medical schools, showing that in Ohio, at least, they still think that they have an undersupply problem.

But perhaps this question alone is too simplistic. One of the small group discussions at this meeting concluded that it is shortsighted to talk just in terms of the numbers of physicians available and the numbers needed. The real responsibility is to determine the needs for health services. Only after such a determination will society be able to sort out the proper tasks of not only physicians but also of all other providers who come in contact with patients.

In this regard, Dr. Lewis and others seemed to be delivering a similar message to us. That is, the health system can illafford to shape its design exclusively around the needs and desires of physicians. To do so not only would lead to the most expensive system imaginable. but to a skewing of the assignments of nurses, midwives, physician extenders, and the allied health workers of the world.

I found very interesting several of the statistics in Dr. Lewis' paper that were taken from his recently published survey of innovative changes in health services. As you will recall, some 1,000 physicians who were making innovative use of support personnel were identified and interviewed. The arrangements that had been fashioned by these physicians for the most part were *ad hoc*, but, more important, workable. And almost half of them indicated that they preferred it that way. That is, they preferred training their help on the job rather than taking them from what they perceived to be ill-fitting educational molds.

That tells us we not only face a job of persuading physicians that it makes good sense to use physician extenders and other support personnel, but also that these physicians must be persuaded that the extenders have been properly trained and educated.

The whole question of who should do what tasks in the health system is a pressing matter. That became clear throughout the conference. A sense of some urgency exists in finding answers.

The question of whether the Institute of Medicine should undertake a study is before its Council. The answer that I heard throughout the meeting in the small conferences was an unqualified 'yes.' But whether or not the Institute decides on its own initiative to undertake the study, Congress, it appears, soon will be pressing the Institute to launch such a study on the issue anyway. Tucked into the health manpower bill soon to be introduced by Congressman Rogers will be a directive calling for a study of who is doing what. And, according to my source on the Hill, this study "undoubtedly would go to the Institute."

Turning briefly to forecasting, I wanted to share with you a personal experience in the importance of forecasting, the influence of forecasting, in the Washington policy sphere. In June 1971 I wrote a 15,000-word article on the policy debate raging on the extension of the Health Manpower Act of 1968. The conventional wisdom at the time was that the country faced critical health manpower shortages. I quote directly from my second paragraph:

"The general agreement is that the current shortage amounts to 50,000 doctors, 18,000 dentists, 150,000 nurses and thousands more allied help personnel." And these figures were generally bandied about by Secretary Richardson, by the legislators on the Hill and others who were involved.

After the story was published, Paul Ellwood asked me if I ever had asked myself whether those shortages really did exist. I answered instantly, "no," and said I thought the question was irrelevant. The estimates of shortages that I cited were gospel in the Washington litany of policy-makers. My first rule is to write policy-relevant stories rather than to question the conventional wisdom.

The consensus on those 1971 figures has now been shattered in Washington, as this year's debate will attest. But the point is this: forecasts are not worth the paper they are written on if politicians do not believe them. I do not know where the 50,000 physician shortage estimate came in 1971, but it was believed and that was the only thing that mattered.

What are the problems of distribution that were discussed at the conference? The conference reiterated a point that nobody seems to argue with: this country faces severe problems of maldistributed health manpower. This is perhaps the single most serious problem in the health manpower sphere.

But nobody is quite sure how to deal with the problem. Dr. Endicott pointed out that the problems of supply and distribution are virtually inseparable. And he also predicted that despite the dramatic growth in family practice residencies in the last three years--from 265 in 1970 to more than 1,000 in 1972--the numbers are too small to make a significant difference. "The primary care manpower pool will, at the very best, just keep pace with the overall growth in the M.D. population," he predicted. Dr. Endicott concluded with the perception that "our primary care problem is quite substantial and it is not a matter than can be addressed by tinkering or making minor adjustments in the system."

Dr. Endicott's conclusion is backed up by a quick look at the Administration's draft health manpower bill. There have been many drafts, of course, and many major questions remain unresolved despite a prolonged internal debate at HEW and now between HEW and the Office of Management and Budget. Nevertheless, to emphasize its determination that medical schools must produce more family practitioners, the Administration plans to offer, for the first time, sizable capitation grants for family practice residencies.

The Administration apparently plans to propose this, while at the same time terminating capitation grants for schools of veterinary medicine, pharmacy and nursing. Moreover, such subsidies for schools of medicine, osteopathy, and dentistry would be phased down.

The capitation grants for family practice residencies would authorize per student payments of around $2,000 a year. This level of funding would compare with authorized spending of $1,500 for capitation grants in fiscal 1975 for the so-called MOD schools (medicine, osteopathy, dentistry) and $1,000 for these same schools in fiscal 1977. In other words, $2 for family practice and $1 for these other categories.

Unfortunately, though, this effort to target increased Federal resources on producing more family practitioners gets lost in the total product which one wag has suggested should be called the "Decapitation Act of 1974."

Let me just give you a few of the subtitles to the major titles in one of HEW's late April drafts. And I stress that there have been a number of drafts. And, again, these are subtitles.

"Phase-out of construction grants. Limitation of loan guarantees. Reduction of capitation ceilings. Termination of capitation for schools of veterinary medicine, pharmacy and nursing. Termination of bonus enrollment grant. Consolidation of special project authorities. Extension of financial distress grant program, but termination of eligibility of schools of veterinary medicine and pharmacy. And limitation of amount of grants. Phase-out Federal capital contributions to student loan funds."

In short, and I certainly do not hold Dr. Endicott accountable for the shape of the bill, the Administration is about to so overplay its hand in a bid to more highly target fewer Federal health manpower dollars that it will be lucky to find politicians on Capitol Hill that will introduce its bill, much less support it.

This, incidentally, is not a singular phenomenon. It runs like a thread through much of the Administration's health policy-making--refusing to factor into its equation political reality.

I think there is a major exception, though, that I should mention, and that is the Administration's health insurance bill. I am not, I would like to emphasize, taking exception to the substance of their policy, only to its heavy-handed style. To arrive on Capitol Hill with a proposal to decimate Federal health manpower funding on the day Congress turns to the issue--with the full expectation of bolstering the Federal commitment--is to arrive too late.

What does the future hold in terms of the expressions of opinions and attitudes at this conference?

I get the distinct feeling that there is a broad consensus for the view that the health system is going to have to redefine the mission of physicians soon, in the interest of the system's own autonomy from Federal control and to make better use of other kinds of personnel in the system.

This redefinition could hold some of the answers to the problems of maldistribution. Further, this redefinition could educate the public that it is not always necessary to see a physician for every little ailment.

There are also other signs of attitudes and opinions expressed at the conference. And these came to me very late, therefore, they might not fit into the scheme of the talk, but I want to throw them out anyway.

There was discussion this morning in one small group that the government should seriously consider regionalization as Canada has done. But it was emphasized that a region should not be a state. Wherever I go, at least in Washington and particularly on Capitol Hill, there is a residue of bad feeling about states and their capacities to administer the system, to monitor the system. I am not quite sure where these negative attitudes come from. But, nevertheless, they are there.

So the argument expressed in the group this morning was consider regionalization--regions that would hold the power of the purse and the access to the system.

Another concern that emerged from the conference revolved around the absence of data and information to make decisions which are appropriate and which are wise. I think the Institute of Medicine, well, let me put it this way, I consider the Institute of Medicine a lobby, really. I define lobby very broadly and consider one element of my definition as any organization which has the knowledge and information to influence and shape policy. The Institute clearly has that. Therefore, there is a feeling here that the lack of information and the lack of data that not only exists at the Institute, but exists in a lot of places, particularly in policy-making places on Capitol Hill, is a vital need that should be filled.

Finally, I do not have a lot of confidence--and I should say this is perhaps a summary of my biases rather than of the conference--I do not have a lot of confidence that the health system, itself, will be successful in redefining and, more important, reshaping the duties of a physician so that he can make more productive use of himself and of physician extenders and other support personnel; or, for that matter, whether the average physician perceives that it is in his interest to be subjected to a reshaping of his professional way of life.

Therefore, I look for the enactment of national health insurance, an event that is going to impact on virtually every segment of the system, to move government down the road toward health manpower regulation. It was suggested in one small group that this course is inevitable. And physician-lawyer-Congressman Bill Roy has articulated his belief that it is not only inevitable but that it is right--in a bill, HR 14357, which he introduced originally several weeks ago as the sole sponsor. He reintroduced it yesterday with seven co-sponsors, all of whom sit on the Rogers' health subcommittee.

I believe that the bill is ahead of its time. Politicians by and large still consider it too radical a step to require physicians to practice in medically underserved areas as the price for the substantial Federal subsidies that helped finance their education. But wait until national health insurance comes and all Americans have financial access to the system, but still find health care inaccessible because, in their rural community or their marginal inner-city neighborhood, no physician has chosen to practice. Watch the politicians rise up then and rally around a bill similar to Bill Roy's bill in 1978 or 1980, tying the Federal government's commitment to subsidize medical education to a requirement that physicians serve time in underserved areas. This kind of government regulation has a lot of appeal, initially at least, to the average consumer.

I, as others, think it is inevitable, although I confess to not knowing whether it is desirable.